Promoting transparency in sustainable infrastructure procurement

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Contents

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Abbreviations

CoST	CoST – the Infrastructure Transparency Initiative
CSO	Civil Society Organization
CoST IDS	CoST Infrastructure Data Standard
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
NGO	Non-Governmental Organization
OCDS	Open Contracting Data Standard
OCP	Open Contracting Partnership
OC4IDS	Open Contracting for Infrastructure Data Standards Toolkit
OECD	Organization for Economic Co-operation and Development
SDG	Sustainable Development Goal
UN	United Nations
UN CSD	United Nations Commission on Sustainable Development
UN WCED	United Nations World Commission on Environment and Development
UNDRR	United Nations Office for Disaster Risk Reduction
UNEP	United Nations Environment Programme
UNOPS	United Nations Office for Project Services

Executive Summary

Sustainable infrastructure is key in today's world. It is essential to promote inclusion, increase access to critical services, and ensure economic and social opportunities are available to all. Sustainable infrastructure also plays a key role in facilitating the transition to a low-carbon and resilient economy, contributing to the attainment of the United Nations Sustainable Development Goals and supporting the success of the Paris Agreement on Climate Change.

The term 'sustainable' embraces social, economic, and environmental aspects. Consequently, when procuring sustainable infrastructure, policy makers and procuring entities need to consider not only the immediate economic well-being of communities, but also to ensure the fulfillment of long-term environmental, climate and social objectives.

Balancing social, environmental and economic goals can be challenging due to competing needs and priorities. Sustainable infrastructure must generate a positive net economic return without overburdening public debt. Sustainability requires infrastructure to contribute to local development and create opportunities without worsening inequalities and climate change.

If attaining the 'triple bottom line' is inherently a challenge, characteristics of the infrastructure sector exacerbate the issue. An estimated 10 to 30% of infrastructure investments are susceptible to loss due to corruption, mismanagement, and inefficiency, with recent figures highlighting that this loss can escalate to as much as 50% of the investment. The lack of transparent and standardized data further complicates the problem, making it harder for infrastructure planners to formulate coherent policies and for citizens to monitor the procurement of infrastructure.

A collaboration was formed to think systematically on these issues and explore the use of infrastructure data to support the promotion of sustainable infrastructure procurement and improve transparency in the sector**.** With the support of the World Bank Global Procurement Partnership Multi-Donor Trust Fund, an analysis to enhance the CoST Infrastructure Data Standard (CoST IDS)[1] and the associated Open Contracting for Infrastructure Data Standards Toolkit (OC4IDS)[2] was initiated. The CoST IDS, which has been developed by CoST – the Infrastructure Transparency Initiative (CoST), enables transparency by setting out 67 data points that are routinely published by procuring entities at each stage of the infrastructure project cycle. The OC4IDS, which has been jointly developed by CoST, the Open Contracting Partnership, and Open Data Services, describes how to represent each element of the CoST IDS as structured open-data.

The analysis had a dual purpose: to take stock of how stakeholders in the sector are responding to new sustainability challenges, and to look ahead into areas where additional transparency would be warranted to enhance long-term project

[1] https://infrastructuretransparency.org/wp-content/uploads/2017/12/CoST-Infrastructure-Data-Standard.pdf

[2] https://standard.open-contracting.org/infrastructure/latest/en/projects/

sustainability. Leveraging synergies, a parallel collaboration with GIZ was developed, focusing on areas related to climate finance sustainability aspects.

The purpose of this report is to equip public sector officials, civil society and stakeholders in the sector with new datasets to assess and evaluate sustainable infrastructure. The analysis considers different dimensions of sustainability, namely the social, environmental, climate, economic, and institutional aspects of infrastructure projects. The goal is to leverage infrastructure transparency to meet global challenges and procurement needs, using available data to ensure that the procurement of infrastructure projects is inclusive, environmentally responsible, and mindful of future generations.

The analysis employed a multi-method participatory approach. This included a desk review, a comprehensive survey that garnered 278 responses from 69 countries, focus group discussions involving stakeholders from government, civil society, private sector, academia, and media professionals, as well as expert interviews. It also involved the development of a sustainability framework, drawing inspiration from concepts established by the UN Commission for Sustainable Development, the Organisation for Economic Co-operation and Development (OECD), and the Inter-American Development Bank (IADB).

The key messages of the analysis are the following:

- Governments generally do not have a central repository that collates and publishes data relevant to sustainable infrastructure.
- Available databases lack a systematic approach to the publication of sustainable infrastructure data points.
- Stakeholder groups have different opinions on the areas of sustainability that should be prioritized. Strategic planning, including alignment of projects with high-level policy plans and investment strategies, are a common interest across government, the private sector, civil society, media, and international financial institutions.
- Expert opinion diverges from the priorities selected by stakeholder groups, particularly in areas related to climate impact, which is highlighted only by experts as a mean to benchmark the sustainability of future infrastructure projects.
- Areas with the lowest levels of importance across the different groups of survey respondents – such as lobbying activities, project plans for net zero, and debt sustainability assessments – also coincide with the highest levels of “I don’t know” answers. This indicates a potential lack of knowledge on these matters.
- Information on beneficial ownership, long-term socioeconomic impact of investments, and project beneficiaries were considered important aspects by CoST members and experts.
- A re-evaluation of the concept of "project location" is essential to address emerging global and procurement challenges. A new approach should go beyond the immediate area of construction and better understand social, environmental, and climate influence and ripple effects on a much broader area.
- Health and safety data are particularly challenging to define due to a lack of documented evidence in the sector. But hard-to-quantify issues can be

transformed into planning indicators, as in the case of labor budgets, or implementation proxies, such as construction materials testing.

- The risk of greenwashing and social washing is a concern. Data points capturing sustainability issues without generating blank statements can minimize such risks.

Based on the findings, a set of 45 data points has been identified. This was informed by recognized standards in the data domain, such as the Standard for Sustainable and Resilient Infrastructure (SuRe), International Finance Corporation (IFC), RICS – International Cost Management Standard, LandMark Map, Open Ownership, ISO, ENVISION, the World Bank Environmental and Social Framework, among others**.** The data points will help assess sustainable infrastructure procurement related infrastructure. They consider a prospective approach and look at information that can support policy makers and procuring entities to reach the next level of infrastructure sustainability.

The data points will work as optional modules within the existing CoST IDS and OC4IDS. Governments and procuring entities can adopt the relevant module(s) for a deeper understanding of sustainability and integrity of their infrastructure investment. The proposed data points will be applied by CoST members and other interested partners with a view to scaling up their adoption worldwide.

A model of how the data points will be structured in OC4IDS can be found at https://standard.open-contracting.org/staging/infrastructure/oc4ids-review-docs/en/cost/ids/sustainability/. Table O.1 provides a summary of the data points grouped by the corresponding sustainable infrastructure module, as follows:

- The 11 economic and financial data points cover short and long-term budget implications of projects, as well as the operation and maintenance stage of the project cycle.
- The 11 environmental and climate resilience sustainability data points include biodiversity, disaster, and climate related risks.
- The 12 social sustainability data points cover a range of project impacts, from gender, inclusion, and participation to health and safety matters.
- The 11 institutional sustainability data points consider means to assess project coherence with existing policies, as well as integrity risks in decision-making, access-to-information and monitoring practices.

Climate finance related data points were also identified to enhance transparency in infrastructure investment and are detailed in separate material supported by GIZ.

This report is divided into three parts. Part I explains the framework, methodology and review process that was developed. Part II examines the body of evidence and findings from the various sources under consideration. Part III presents the new modules and corresponding data points.

Table O.1 Sustainable Infrastructure Data Points and Information

Economic and financial	**Environmental and Climate Resilience**
• Procurement strategy • Life-cycle cost • Life-cycle cost calculation methodology • Funding source for preparation, implementation and maintenance • Budget for preparation, implementation and maintenance • Cost-benefit analysis • Value for money • Asset lifetime • Budget projections • Budget shortfall • Maintenance plan	• Environmental impact category • Environmental measures • Environmental licenses and exemptions • Protected area • Conservation measures • Climate and disaster risk assessment • Climate measures • Forecast of greenhouse gas emissions • Environmental certifications • Decommissioning plans • Decommissioning cost forecast
Social	**Institutional**
• Number of beneficiaries • Inclusive design and implementation • Indigenous land • Public consultation meetings • Land compensation budget • Labor obligations • Labor budget • Workers' accidents • Health and safety certifications • Construction materials testing • Building inspections • Jobs generated	• Policy coherence • Freedom-of-information requests • Answers to freedom-of-information requests • Lobbying transparency • Beneficial ownership • Sustainability criteria • Anti-corruption certifications • Independent monitoring • Performance monitoring • Risk management plans • Sustainable subsectors

Source: World Bank, CoST and Open Data Services.

Part I: Preparing the Groundwork

1. Introduction

1.1 Infrastructure procurement is changing

Infrastructure is essential to achieve the United Nations (UN) Sustainable Development Goals (SDGs) as more than 80 percent of the individual SDGs targets are associated with the sector (UN Environment Programme (UNEP) 2019). At the same time, 79 percent of greenhouse gas emissions come from infrastructure and 88 percent of all adaptation costs need to be borne by the sector, which can put at risk the success of the Paris Agreement on Climate Change (UN Office for Project Services (UNOPS) 2021).

To ensure that global targets and goals are met, the infrastructure to be built, expanded, and adapted must be sustainable and resilient to shocks. It must be designed to mitigate economic, social, and environmental risks and generate economic, social, and environmental benefits, including climate change mitigation and adaptation.

However, procuring sustainable infrastructure encounters numerous challenges in balancing social, environmental, and economic goals. This balancing act is acknowledged in the World Bank's (2021) report titled "A Global Procurement Partnership for Sustainable Development," which highlights how procurement practices are evolving to accommodate these diverse and sometimes competing needs and priorities. This shift makes a move away from a purely transactional approach focused on economy and efficiency towards a broader policy-based concept, where environmental sustainability, support for small enterprises, and protection to vulnerable groups are key.

In a sector as complex as infrastructure with an often-opaque value chain and multiple decision-makers, transparency is paramount. The lack of transparent and standardized data exacerbates this problem with the International Monetary Fund estimating that 10 to 30% of infrastructure investments worldwide is lost due to corruption, mismanagement, and inefficiency. This can escalate up to 50% in low-income countries.[3]

Global challenges corroborate the call for additional transparency and improved governance in the procurement of infrastructure. Labor compliance, resilience, and climate change are some thematic areas that infrastructure procurement still needs to address to deliver long-term value from projects. Social needs have also changed with CoST, the Infrastructure Transparency Initiative reporting that stakeholders are demanding information on how infrastructure is responding to gender and inclusion challenges.

[3] https://www.imf.org/en/Blogs/Articles/2020/09/03/blog090320-how-strong-infrastructure-governance-can-end-waste-in-public-investment

1.2 The value of transparency and data standards

Transparency can be defined "as citizen access to publicly available information about the actions of those in government and the consequences of these actions" (World Bank 2016). Transparency changes the way government operates, transforming the relationship between people and officials and broadening participation in decision-making.

Despite significant progress in the sector, led by access to information laws and open government initiatives, transparency is still a challenge. The Organization for Economic Co-operation and Development (OECD) indicates poor data standardization and limited transparency as fundamental barriers for achieving sustainable infrastructure (OECD 2020a).

Transparency involves not only publishing reliable, relevant and timely information, but also actively inviting stakeholders to make use of the available information.[4] Planners and policy makers need reliable information to formulate coherent policies and strategies. Citizens and civic groups need information to ensure accountability and participation in decision-making.

In this context, the implementation of infrastructure data standards addresses a critical transparency issue in the sector. Infrastructure standards help streamline the complexity of the sector, generating meaningful and standardized information that different groups of stakeholders can utilize effectively. By supporting the scalable publication of key infrastructure information, infrastructure data standards enhance project monitoring, accountability, and public scrutiny.[5]

The CoST Infrastructure Data Standard (CoST IDS) and the associated Open Contracting for Infrastructure Data Standards Toolkit (OC4IDS) exemplify how transparency and standardization can work together effectively in the sector. These standards provide a structured framework for publishing infrastructure information, ensuring that data is accessible, comparable, and useful for stakeholders ranging from government agencies to the general public.

1.3 Developing indicators and data points

To reflect sector and global needs, as well as what is expected from infrastructure investment and public procurement, a collaboration was formed between the World Bank, CoST, and Open Data Services, with the support of the Open Contracting Partnership, to help standardize datasets around sustainable infrastructure procurement. More than ever, sustainable infrastructure is essential to ensure critical systems and services are in place to meet people's needs and address global challenges effectively. Knowing what data and information are needed to help achieve this goal is a fundamental step towards good quality and long-term value of infrastructure procurement.

This report focuses therefore on developing new datasets that can support the procurement and transparency of sustainable infrastructure. The following questions are addressed on this report:

[4] https://blogs.worldbank.org/governance/why-we-should-care-about-transparency

[5] https://standard.open-contracting.org/infrastructure/latest/en/

- What are the key indicators to help assess the procurement of sustainable infrastructure related infrastructure?
- Which data points are needed to measure the key indicators, improve sector transparency and support stakeholders to understand the performance and impact of sustainable procurement in infrastructure?

The indicators and data points will be used to inform an updated version of the CoST Infrastructure Data Standard (CoST IDS) and the Open Contracting for Infrastructure Data Standards Toolkit (OC4IDS). CoST developed the CoST CoST IDS[6] in 2012 as a tool for promoting transparency in infrastructure procurement. The CoST IDS identifies 67 key points of data and information that should be published at each stage of an infrastructure project, allowing stakeholders in government, the private sector, and civil society to monitor these investments (see Box 1.1).

Box 1.1 CoST IDS

The CoST IDS developed in 2012 includes 40 categories of information that must be proactively published by authorities, including:

- Project data: 20 data points related to the identification, preparation, and completion phases of projects.
- Contract data: 20 data points related to the tender process and implementation phases of contracts.

There are also 27 categories of data that need to be made available upon request at both project and contract level (reactive disclosure).

See Appendix A for the full set of data points.

Source: CoST

The CoST IDS covers key stages of the procurement of infrastructure, from planning and identification to implementation and completion of projects assets. It has been used by governments, civil society, and private sector partners which joined CoST as members to standardize the transparency of information from infrastructure investments, guiding stakeholders on what information should be published for public scrutiny.

A defining feature of the CoST IDS is that it combines project and contract data and information across the life cycle of projects.[7] Project data includes location, purpose, scope, funding source for implementation, completion cost and date, status, and

[6] https://infrastructuretransparency.org/wp-content/uploads/2017/12/CoST-Infrastructure-Data-Standard.pdf

[7] The term 'project' refers to an infrastructure project, defined as the development of a set of infrastructure assets in a specified location, generally the responsibility of a single procuring entity and budget authority. Project-level data relates to the project as a whole and covers the identification, preparation, implementation, and completion stages. Within an infrastructure project, a procuring entity can initiate multiple contracting processes for the project design, construction, or supervision. Contracting process data relates to the contracts used to deliver the project and covers the procurement and implementation stages of such contracts. For more information see: https://standard.open-contracting.org/infrastructure/latest/en/projects/#what-is-a-project.

reasons for changes in cost and scope. Contract data includes essential points for the assessment of different contracts under the same project, such as design, supervision, and construction. The type of contract, start date, duration, variations to scope and price, and justifications for these are examples of contract data.

The CoST IDS also combines data that must be proactively published by public authorities and information which needs to be made available upon request. Examples of the latter at project level include feasibility studies, environmental and social impact assessments, and technical and financial audit reports. At contract level, examples include tender documents, quality assurance reports, disbursement records, payment certificates, and contract amendments. The full set of CoST IDS data points and pieces of information is included in Appendix A.

In 2019, CoST, the Open Contracting Partnership (OCP), and Open Data Services co-developed the Open Contracting for Infrastructure Data Standards Toolkit (OC4IDS).[8] The OC4IDS describes how to structure and publish the systematic list of data and information that is recommended in the CoST IDS as open data. This helps to improve the inter-operability and use of the published data.

The OC4IDS has been integrated into government systems in countries such as Ghana, Indonesia, Malawi, Mexico, and Ukraine. Since 2015, data on over 80,000 infrastructure projects have been published using the CoST IDS or the OC4IDS, which has helped to bring unprecedented levels of transparency and accountability to the sector.

However, in view of global challenges and needs, the CoST IDS and OC4IDS do not currently address the broader aspects of sustainable infrastructure procurement. They also need to address the decision-making, operation and maintenance, and asset disposal stages of the infrastructure project cycle which are critical to ensuring the sustainability of the investment. Expanding the scope of the CoST IDS and OC4IDS to include sustainability aspects will significantly enhance the overall effectiveness and long-term impact of infrastructure projects. This approach will combine transparency with data standardization, ensuring that projects are not only accountable but also sustainable throughout their entire lifecycle.

[8] https://standard.open-contracting.org/infrastructure/latest/en/projects/

2.Methodology

2.1 Work Stages

The work described in this report was developed in four stages:

1. An exploratory desk review to understand the sustainability domain, which included assessment of key concepts, definitions, attributes, and criteria applied by stakeholders and practitioners when defining and qualifying sustainable infrastructure (see Chapters 3 and 4).
2. Assessment of the demand for data, focusing on understanding stakeholders' needs and interests and including a process of mapping priority thematic areas that could inform updates to the CoST International Data Standard (CoST IDS) and new modules for the associated Open Contracting for Infrastructure Data Standards Toolkit (OC4IDS). The demand for data was assessed through a global survey combined with focus groups and key informant interviews (see Chapter 5).
3. Assessment of data supply, involving the mapping of the information already in the public domain or that is being published by supranational institutions and governments to identify how data is captured, formatted, and disclosed (see Chapter 6).
4. A modeling of the new data points accompanied by development of a disclosure template that can be applied with CoST members and elsewhere (see Chapter 8).

Data was collected from primary and secondary sources. A survey was first carried out of sector stakeholders, which included representatives from civil society, private sector, academia, media, international financial institutions, and government officials, to seek their views on the priority thematic areas and conditions around infrastructure sustainability. A collaboration with GIZ was developed in parallel, focusing on climate finance sustainability aspects. Due to identified synergies, the survey incorporated climate finance sustainability aspects.

The survey was complemented by focus group discussions with CoST stakeholders from the multi-stakeholder group representatives (government, private sector, and civil society), journalists, CoST member managers, and independent assurance professionals to understand the challenges and opportunities of adding new modules and datasets to the CoST IDS and OC4DIS. To triangulate the findings, in-depth interviews were carried out with experts in specific areas of interest.

Two discussion workshops were held to deliberate on the findings. This involved procurement experts, international financial institutions, and civil society representatives. The objective was to foster conversations about the findings and the uptake of the suggested data points.

2.2 Limitations

The main limitation of the work is the lack of direct community engagement in the assessment of the demand for data. Civil society groups were involved in the survey, the focus groups, the expert interviews, and the discussion workshops, which helped to balance the dynamics of power within the sector and allowed multiple perspectives to be captured. CoST members and their respective multi-stakeholder constituencies

were also an active voice throughout the review process, offering their views on data needs and priorities. However, this does not equate to directly hearing from communities who are first-hand affected by infrastructure development and sustainability issues arising from it.

The use of data points and their capacity to influence policy outcomes are dependent on how they are designed and developed (Lehtonen, Sébastien, and Bauler 2015). An application stage to test the new data points with interested partners will allow communities to directly voice concerns and opinions regarding the proposed data points and their role in capturing sustainability risks. This will ensure meaningful accountability from below and a feedback loop to refine the work developed.

A second limitation relates to the challenges in developing new datasets. Indicators are “symbolic representations designed to communicate a property or trend in a complex system or entity”.[1] Data points simplify complexity, so difficulties do exist to capture all variables and nuances. Conflicting interests and needs add to the problem and to the process of prioritizing indicators and data points. The findings in this report draw upon a wealth of evidence gathered from various sources, including surveys, workshops, and interviews. This information has been instrumental in steering the process of prioritizing data and modeling the new data points.

[1] https://www.climate-policy-watcher.org/sustainable-development/challenges-to-sustainability-indicators.html

3. Framework for this Report

3.1 The Concept of Sustainability

“Sustainability” can mean different things to different people. The initial references to the word were associated with economic externalities and the need to understand environmental and resource constraints (Freyman 2012).

The United Nations (UN) was a major driver in the evolution of the concept. The first formalized attempt to combine development and environmental goals occurred in 1987 when the UN World Commission on Environmental and Development (WCED) Brundtland Report termed the concept of sustainability as the “the ability to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs” (UN WCED 1987).

After 1987 the concept continued to progress, adding new dimensions to the ecology perspective. In 2001, the UN Commission for Sustainable Development (CSD) highlighted social and institutional dimensions of the concept (UN CSD 2001). These were later incorporated by the UN 2002 World Summit on Sustainable Development and summarized around three pillars of sustainability: people, place, and prosperity (UN 2002).

The definition of sustainable infrastructure has followed a similar trajectory. Initially centered on economic and financial sustainability, it has evolved into a triple bottom line encompassing economic, environmental and social goals. Infrastructure is considered economically sustainable when it does not strain governments with insurmountable debt or impose exorbitant costs on users. Projects attain environmental sustainability by conserving natural resources and minimizing pollution. Social sustainability is achieved when infrastructure is inclusive, accessible and contributes to livelihoods and well-being (The New Climate Economy, 2016).

With the emergence of new challenges, it becomes necessary to integrate additional nuances into the concept of infrastructure sustainability. The climate emergency pushes infrastructure to reduce emissions, recycle and reduce the waste of materials, and optimize the use of resources (Bhamra and Hernandez 2021). The Covid-19 pandemic highlighted the importance of resilient infrastructure, particularly in view of the growing dependency between infrastructure systems. It has also brought to light the fragility of some financing structures and how the drop in revenue can impact the operability of critical infrastructure (Organization for Economic Co-operation and Development (OECD) 2021).

Natural disasters also play a role in the way infrastructure sustainability is understood. The impact of climate hazards will increase over time, which means that sustainability needs to account for the various stages in the development of infrastructure and cannot ignore issues that emerge during operation, maintenance, and decommissioning (Sanderson and others 2022).

Poverty and spiraling inequalities also push the boundaries of what is expected from infrastructure investment, stressing the importance of adequate decision-making and

planning to maximize the social value of infrastructure and deliver broader social outcomes and not just engineering outputs (Useful Projects 2020).

Governance factors ultimately play a crucial role in guaranteeing sustainability. Improved transparency in public finance, mechanisms to measure performance and the effectiveness of spending, and the establishment of robust anti-corruption frameworks are essential to achieve sustainable infrastructure procurement (World Bank 2008).

The above aspects highlight the different layers of sustainability that need to be understood in moving towards more sustainable infrastructure procurement.

3.2 Quality Infrastructure, Resilience, and Sustainability

A conceptual challenge identified in the literature relates to the notions of quality, resilient, and sustainable infrastructure. Despite being occasionally used together and interchangeably,[2] each term contains subtle differences.

Resilient infrastructure is linked to the ability of assets to bounce back after shocks. It is a concept which is closely connected with the operation and maintenance of infrastructure, since resilient infrastructure can resume operation quickly and require less frequent repairs during maintenance. But it is also a matter of adequate planning given the relevance of "safe-to-fail" designs to ensure asset resilience (UN Office for Disaster Risk Reduction (UNDRR) 2022).

Many standards include resilience as a measurement of infrastructure sustainability. The Standard for Sustainable and Resilient Infrastructure (SuRe) (Global Infrastructure Basel Foundation 2021) applies different criteria to assess sustainability. One of these is dedicated to resilience planning, which includes the analysis of hazard scenarios, vulnerability assessments, and adaptation measures adopted by projects.

Quality infrastructure, on the other hand, is a broad concept that gained traction during the Japanese presidency of the Group of Twenty in 2019. Quality in infrastructure means "a degree of excellence and innovation in infrastructure service provision" (Aizawa 2019). According to the Japanese Government, the quality of infrastructure includes essential attributes and characteristics of projects such as inclusion, contribution to local economy, economic efficiency, and sustainability. The latter is construed as harmony with the environment, maintaining high performance, optimized operation, and continuous management and oversight.

The quality of infrastructure can be measured in view of the degree of resilience, more specifically how reliable assets can be during shocks and disruptions. The quality of infrastructure also has an impact on aggravating shocks, since poor quality infrastructure can amplify ecosystem destruction and the impact of climate events on people's lives (OECD 2020b).

[2] See for example UN Sustainable Development Goal 9, Target 9.1 of which states the goal is to: "Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all". See https://www.globalgoals.org/goals/9-industry-innovation-and-infrastructure/.

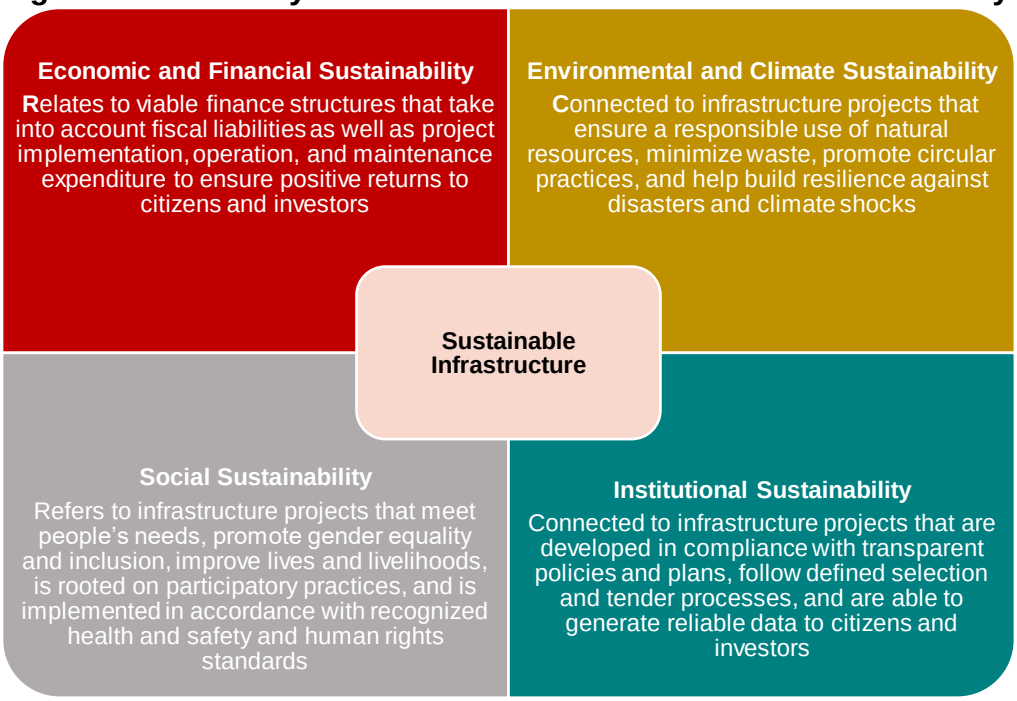
Recent climate events have demonstrated that if infrastructure assets and networks experience the physical impacts of shocks, they also play a crucial role in reducing emissions and enhancing resilience to those impacts. A profound transformation of infrastructure systems is essential to meet global climate and development objectives. This transformation includes prioritizing, planning, designing, constructing, and operating infrastructure assets while considering the climate impact they generate throughout their lifespan. There is also a need to operate, rebuild, or adapt existing infrastructure, which may require retrofitting as well as employing different resilient management approaches in response to climate change.

Sustainability is, therefore, a common thread in the definition of both quality and resilient infrastructure. Using sustainability as a guidance to this report can help generate a body of evidence to help policymakers and practitioners understand the drivers of resilient and quality projects, at the same time as tackling key challenges of today.

3.3 Dimensions of Infrastructure Sustainability

The Inter-American Development Bank definition of sustainable infrastructure includes "infrastructure projects that are planned, designed, constructed, operated, and decommissioned in a manner to ensure economic and financial, social, environmental (including climate resilience), and institutional sustainability over the entire life cycle of the project" (Inter-American Development Bank 2019). This definition captures the different stages of the project cycle as well as key areas of impact that are summarized in Figure 2.1: economic and financial, environmental and climate, social, and institutional.

Figure 2.1 Summary of Dimensions of Infrastructure Sustainability



Source: Adapted from Inter-American Development Bank 2019.

In accordance with the above definition of infrastructure sustainability and its diverse dimensions, it is crucial to delineate the distinct characteristics and attributes associated with each thematic area. These are outlined as follows:

- **Economic and financial sustainability** is linked to different aspects of viable financing structure, including the capacity of infrastructure projects to generate jobs and to maintain positive liquidity, solvency, and debt ratios.
- **Environmental and climate sustainability** is connected to metrics that reduce pollution and waste, protect biodiversity as well as climate-risk-management practices and the efficient use of resources.
- **Social sustainability** attaches to the equitable distribution of the benefits and the impacts of projects, and includes metrics related to participation, gender and the effects of projects on indigenous populations and the labor force.
- **Institutional sustainability** looks at the regulatory framework as the enabler of integrity and efficiency in procurement, including compliance with national and international commitments and policies, as well as data transparency and accessibility.

These characteristics and attributes help substantiate the concept of infrastructure sustainability, providing guidance on how sustainability can be practically understood within the sector. Figure 2.2 lists these project attributes and metrics according to the different dimensions of infrastructure sustainability. This report takes such framework as its starting point, employing it to generate data points aimed at enhancing stakeholders' comprehension of infrastructure sustainability.

3.4 Challenges and Opportunities

Challenges have been identified in the literature in relation to the concept of sustainability and how to interlink these different thematic dimensions. The first challenge relates to the need for an integrated approach so there are no conflicts that could potentially invalidate each of the dimensions. For example, infrastructure systems that are focused on mitigating climate change, such as large hydropower plants or wind turbines, may put at risk the lives and livelihoods of indigenous groups and local communities (The Economist intelligence Unit 2019). Accounting for these trade-offs and interactions is essential to avoid contradictions that can undermine the goal of delivering sustainable assets and services.

Non-standardized metrics is another challenge (WWF and Oliver Wyman 2020). Difficulties in collecting data connected to infrastructure sustainability can emerge given the absence of standard metrics across projects and sectors. Difficult-to-quantify metrics, such as those related to climate and biodiversity impact for example, also add to the problem and increase the difficulties of data standardization.

The multitude of sustainable infrastructure standards and tools is also a challenge (OECD 2019). The plethora of definitions, tools, and principles related to sustainable

infrastructure[3] create a sense of confusion that can hinder development of a uniform approach to the sector.

Figure 2.2 Attributes of Dimensions of Infrastructure Sustainability

Economic and Financial Sustainability	**Environmental and Climate Sustainability**
Positive net returns and externalities over the project life cycle Growth, productivity, and positive spillovers Job creation Access to quality, reliable, and affordable services Adequate risk-adjusted rate of return Clarity on revenue streams Effective risk allocation and management Operating profitability Asset profitability Positive net present asset value Liquidity ratios Solvency ratios Mobilization of local financing Transparent and effective regulatory framework Debt and fiscal sustainability Pricing and incentive alignment for efficient asset use Asset maintenance and optimal operational use	Reduction of greenhouse gas emissions Climate risk management and resilience Disaster risk management Biodiversity management Natural capital protection and avoidance of areas of high ecological value and farmland Maintenance of ecological connectivity and ecosystem services Soil management Invasive species management Preservation and enhancement of public amenities Air contamination monitoring Water pollution monitoring Management of adverse impacts on human health and on the environment Hazardous materials control Efficient use of water resources Material use and recycling Energy use and renewable sources Waste management and recycling
Social Sustainability	**Institutional Sustainability**
Benefit and inclusion of disadvantaged groups Stakeholder engagement, community consultation, and youth participation Grievance redress mechanism Resettlement and economic displacement minimization Community access to resources Compensation of project-affected communities and benefit sharing Community mobility enhancement and connectivity Disability and accessibility promotion Community health and safety Occupational health and safety Preserving rights of affected groups Labor standards Community security and crime prevention Gender-inclusive project design Cultural resources and heritage Indigenous and traditional peoples' rights preservation	Alignment with national and international commitments Integration with national and regional economic, territorial, and urban strategies, policies, and plans Compliance with corporate governance structures Anti-corruption and transparency framework Project design and feasibility assessment Project compliance with legal framework Sustainable bidding and procurement Integrated environmental and social impact assessment Environmental and social management policies and plans Project information monitoring and evaluation tracking system Management of existing liabilities and legacy matters Integration of technological advances Knowledge transfer and collaboration Regulatory, institutional, and local capacity Data collection, monitoring, and local evaluation Institutional, organizational, and individual capacities for implementation

Source: Inter-American Development Bank 2019

[3] Sustainable Infrastructure Tool Navigator is a database of more than 100 tools, rating systems, and benchmarks at https://sustainable-infrastructure-tools.org/search/.

3.5 Relevance and Contribution of this Report

The CoST Infrastructure Data Standard (CoST IDS) has been applied for more than a decade. The community of practitioners from government, civil society, and the private sector applying the CoST IDS, coupled with the experience and knowledge accumulated, can help harmonize different approaches and bring unity to the goal of achieving sustainable infrastructure procurement. An open data standard that is specific to infrastructure sustainability and which can be applied globally in public procurement, contributes to the efforts of data standardization and will enhance transparency and more accountable data practices worldwide.

The new sustainability data points proposed in this report (see Chapter 9) will also build synergies with existing initiatives that operate in the procurement space, such as the Procurement Anticorruption and Transparency platform[4] and the World Bank's Global Public Procurement Database[5]. These initiatives capture data and use analytics to monitor and identify integrity risks in public procurement. Opportunities therefore exist to connect the new data points with existing platforms, using them to develop red flags to help strengthen procurement practices.

The data points can finally provide guidance in the interpretation of procurement rules applied by international financial institutions. From September 2023 the World Bank's Procurement Framework encourages the use of rated criteria to evaluate quality, sustainability, and innovative aspects of bids in international procurement (World Bank 2023). By offering objective grounds to assess sustainability in the infrastructure sector, the proposed data points can offer a "measurement stick" to help evaluate bids and non-price factors.

[4] https://www.procurementintegrity.org/

[5] https://www.worldbank.org/en/topic/governance/brief/global-public-procurement-database

Part II: Collecting the Evidence

4. Desk Review of Sustainability Domain

The exploratory desk review started by identifying areas where the CoST Infrastructure Data Standard (CoST IDS) could evolve. Decision-making, operation and maintenance, and decommissioning are areas not currently covered by the CoST IDS (Appendix 1) and which could benefit from improved transparency. Dynamics of project selection and prioritization are still largely opaque, and additional transparency could bring more clarity around decision-making processes. Assessing the sustainability of infrastructure projects also requires a better understanding of how projects align with infrastructure and climate goals, as well as how projects respond in practice to policy commitments.

The desk review collected feedback from CoST members in 18 countries about CoST IDS coverage. According to CoST members, additional information has already been collected in addition to the CoST IDS, including the following items:

- Approval date of environmental impact assessments
- Social justification of the project
- Number of direct beneficiaries
- Estimated project life span
- Number of special interest group persons that are employed on construction projects
- Participation and consultation with communities and project beneficiaries, including number of women, men, and people with disabilities engaged, proof of these engagements, what issues have been identified, and whether they have been timely addressed
- Laws and regulations applicable to the project which are related to special interest groups, such as women, indigenous populations, and people with disabilities
- Project policies that address environmental and social risks, including the risks of sexual exploitation, sexual harassment, and sexual abuse.

CoST members also reported an interest in the publication of information regarding the following thematic areas:

- Participation of women as owners of bidding companies
- Permits, certificates, and exemptions issued for projects, including related to building, development of works, and environmental conditions
- Evaluation of the objectives for implementing the project and whether these objectives and expected impacts have been met on project delivery and operation

- Beneficial ownership of contractors, subcontractors, and supervising consultants
- Nationalities of contractors, subcontractors, and supervising consultants
- Details of the beneficiary population, such as socioeconomic indicators and by gender disaggregation.

The information provided by CoST members is critical to understanding areas where the CoST IDS could be strengthened. This provides an indication of areas of sustainability that the CoST IDS could evolve based on data that has already been collected and would therefore be readily available by procuring entities for publication. The feedback further demonstrates members' interest to look at the four dimensions of sustainability – social, environmental and climate, economic, and institutional – as well as expanding transparency in relation to operation and decision-making to better understand project justification and impact.

The second part of the desk review was a wide exploratory exercise that identified different metrics broadly referred to in the literature as connected to areas of infrastructure sustainability. Using the attributes of infrastructure sustainability as the starting point, the goal was to map how sustainability has been captured in practice. Anchoring the concept in used metrics helped to shape the concept, countering a common criticism that sustainability is an empty and abstract jargon. The aim was to identify objective measurements which could be used in the survey questionnaire that assessed the demand for new data.

The findings of the exploratory desk review are tabulated for each dimension of infrastructure sustainability – economic and financial, environmental and climate, social, and institutional – in Tables B.1 to B.4 in Appendix B.

5. Survey of Stakeholders

5.1 Overview

A survey was developed to gather the views of different stakeholders in the sector about what information they would consider essential to evaluate the sustainability of infrastructure. The survey also incorporates climate finance aspects due to recognized synergies and relevant impacts on wider sustainability discussions. The survey was structured around 12 thematic areas identified in the exploratory desk review and covering different stages of the infrastructure cycle. The questionnaire survey is in Appendix C.

A five-point Likert scale was applied to measure different degrees of importance attributed to each indicator, including the following options: “not very important”, “slightly important”, “moderately important”, “very important”, and “absolutely essential”, with a residual option “I don't know/don’t have expertise to judge”. The goal was to measure respondents’ demand for additional data on different thematic areas, as well as their priority in comparison to other indicators. The mailing list from CoST was used for a breadth of reach, complemented by social media distribution and direct emails to targeted contacts. The survey was sent in English, Spanish, and Portuguese to ensure language accessibility.

The survey received 278 responses covering 69 countries. The top 15 countries by number of respondents were spread across four continents,[1] including CoST members and countries not directly associated with CoST.

Government officials were the biggest sample of respondents (30 percent), followed by civil society (20 percent), international financial institutions (17 percent), and private sector (17 percent). Academia and media had the smallest shares of respondents, with 8 percent each. In terms of data usage, a mixed result was identified, with the highest percentages of respondents using infrastructure data to carry out research in the sector (28 percent) and to identify infrastructure investments for future monitoring and investigation (17 percent). Geographical coverage and details of data use are shown in Figures D.1 and D.2 in Appendix D.

To assess the finding’s, weighted averages were applied to identify the indicators with the highest levels of importance. The responses “absolutely essential” and “very important” were used to benchmark top priority indicators. The answers were aggregated per group of stakeholders and analyzed considering geographic and regional nuances when applicable. To triangulate the survey findings, 66 people were engaged in focus group discussions and 13 key experts were interviewed for deeper discussions. The findings are described in the following sections, and detailed results are shown in Figures D.3 to D.11 in Appendix D. The climate finance sustainability results are also reported because of their influence on various dimensions of sustainable infrastructure investment.5.2 Group Findings.

[1] Honduras (42), Uganda (21), United States (20), Argentina (15), Thailand (12), Ghana (11), Costa Rica (11), Ethiopia (10), Colombia (10), Mexico (10), Spain (8), Chile (6), Malawi (5), United Kingdom (5), and El Salvador (5).

5.2.1 Government

Government respondents ranked infrastructure planning items with higher scores. The alignment of projects with a national development plan or strategy received the greatest level of importance, which was followed by information on the current and future demand for services based on population and country needs. This shows an appreciation for a broad strategic view of infrastructure that combines long-term planning with national goals and needs. Because alignment with policies and plans can be used to assess the objectivity of the decision-making process, additional transparency around those indicators can help citizens better understand how public priorities are defined.

In the focus groups, government officials stressed that the publication of national development plans would be a way to demonstrate conformity between projects and plans. Even if project information is published after projects have been approved, transparency of long-term plans would provide public assurance that government projects are consistent and coherent with policy goals.

Additional indicators scored as high importance by government stakeholders included information on public participation throughout the project life cycle, risk management plans, and cost-benefit analysis. Economic and financial aspects of projects, such as the amount of investment allocated to project development, were highlighted in the focus groups as having a high priority.

Whereas aspects that impact a project's economic and financial sustainability were highly valued by government respondents – as in the case of risk management plans and cost analysis – the fiscal sustainability of projects received less attention. In comparison with other indicators, debt sustainability assessments and a project's future revenue streams received lower levels of importance.

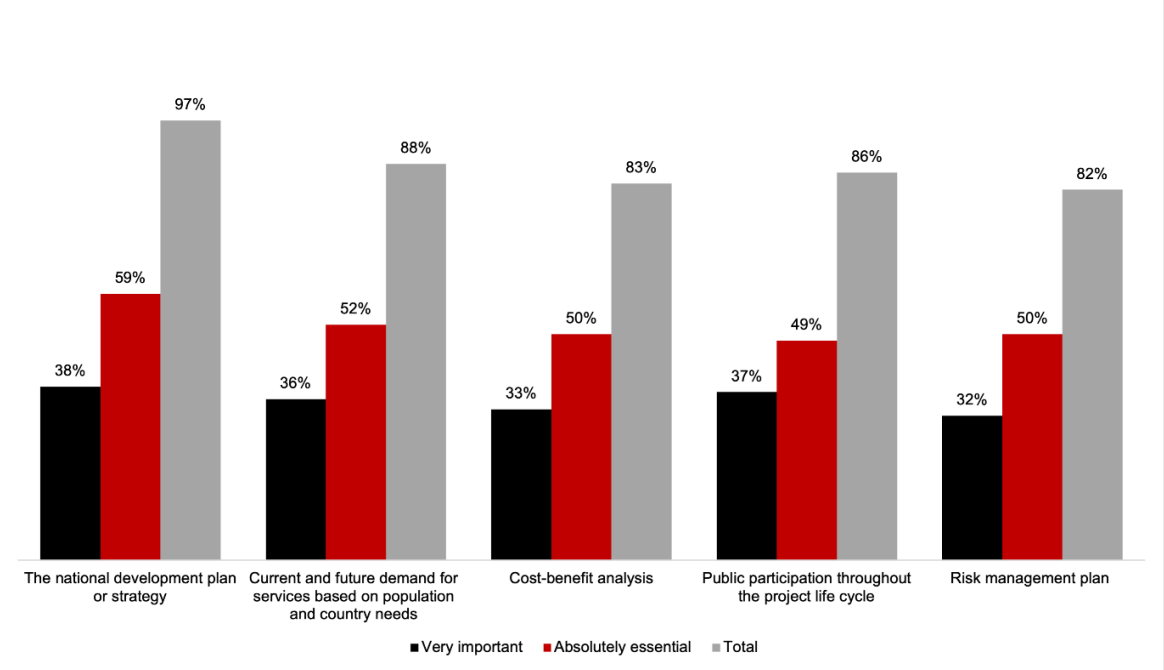
The finding is consistent with the expert opinion captured in the interviews. Public financial management experts reported challenges for public officials to understand infrastructure development in the context of long-term fiscal frameworks. Rather than considering project expenses in view of financial structures, such as budget cycles and fiscal debt, procurement officers tend to focus on immediate annual costs without assessing whole-life-cycle costing, multiyear expenditure, and long-term public commitments. The short-term view of project expenditure also transpired from the focus groups, where no long-term fiscal considerations were raised.

Public participation was ranked as a high-importance item for government. But transparency of lobbying activities was considered one of the indicators with lowest importance for publication, which questions the extent of public participation considered ideal by government bodies. The lower importance attributed to lobbying also seems to contradict the higher importance given to aspects related to the transparency of decision-making.

Considering that social and environmental indicators were not listed among the highest priorities, focus group discussions clarified that these issues can be viewed by government officials as part of social and environmental safeguards, which are mandatory when projects receive international funding. Publication of those indicators would then be understood as part of funding mandatory disclosure. The issue would remain problematic in domestically funded projects, which are the bulk of infrastructure procurement in most countries.

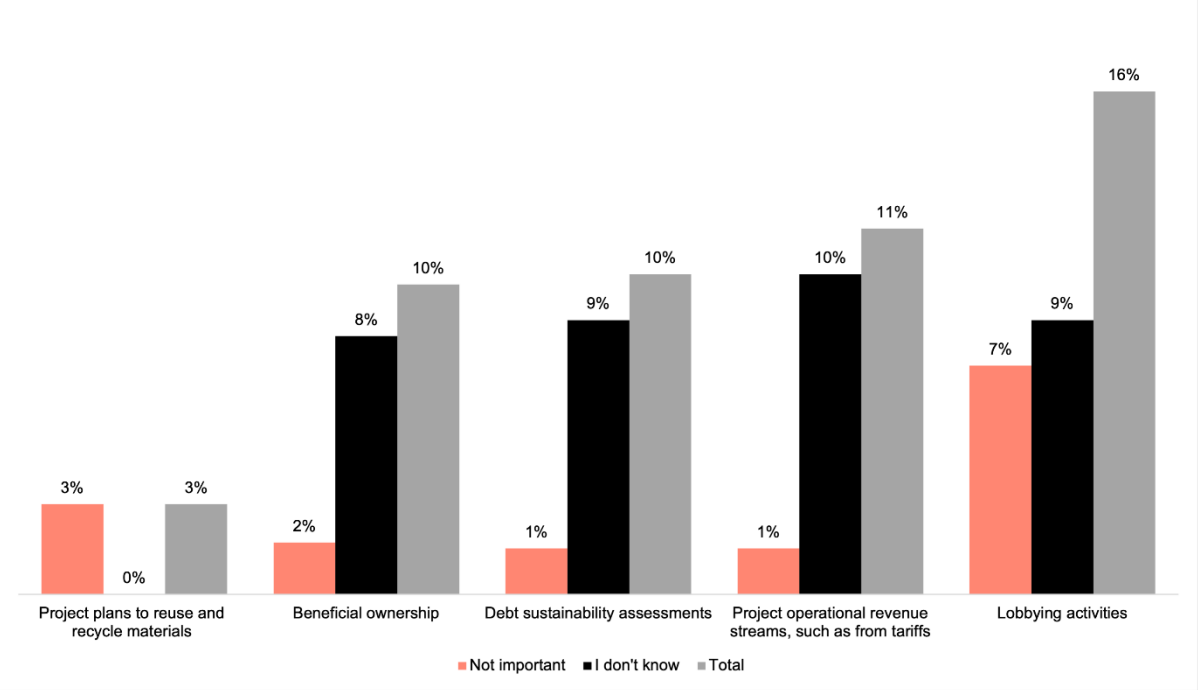
Figures 5.1 and 5.2 summarize the highest and lowest priority indicators for government respondents. The full results from government respondents are shown in Figure D.3 in Appendix D.

Figure 5.1 Government Highest Priority Sustainability Indicators



Source: World Bank, CoST and Open Data Services.

Figure 5.2 Government Lowest Priority Sustainability Indicators



Source: World Bank, CoST and Open Data Services.

5.2.2 Civil Society

The survey indicated that access-to-information mechanisms was a high priority for civil society. Public participation throughout the project cycle was also among the top indicators for disclosure. It is an expected result for civil society groups involved in participation and accountability areas.

Additional indicators that ranked high for civil society included information related to the economic and financial aspects of projects, such as the resources used during implementation, operation and maintenance, and cost-benefit analysis of projects. Concerns with the use of public resources can be an expected priority for civil society, particularly in regions marked by high levels of corruption. In the top two respondent countries, Honduras and Uganda, more than 70 percent of the sample considered these two indicators to be absolutely essential or very important. The results also underscore the civil society's interest in increased transparency regarding project operation and maintenance.

The same trend noted within government respondents was also true for civil society, as debt sustainability assessments were considered only slightly important. Short-term cost considerations seemed also to outweigh long-term fiscal impact for civil society respondents.

Biodiversity was identified as a priority by the group and compliance with safety regulations and building codes was placed in seventh position in the overall ranking of importance. These were priorities particularly highlighted among Latin American respondents and in countries affected by extreme climate conditions, such as Honduras.

Environmental and climate-related indicators received less attention in comparison with other indicators. The amount of greenhouse gas emissions, for example, was among the least important issues identified by the group. This was a surprising finding that contradicted the high importance that was attributed to climate issues during the interviews. Experts considered carbon dioxide emissions to be key to (i) evaluate net zero commitments, (ii) create a baseline to benchmark new projects, and (iii) measure the environmental implications and trade-offs attached to project choices.

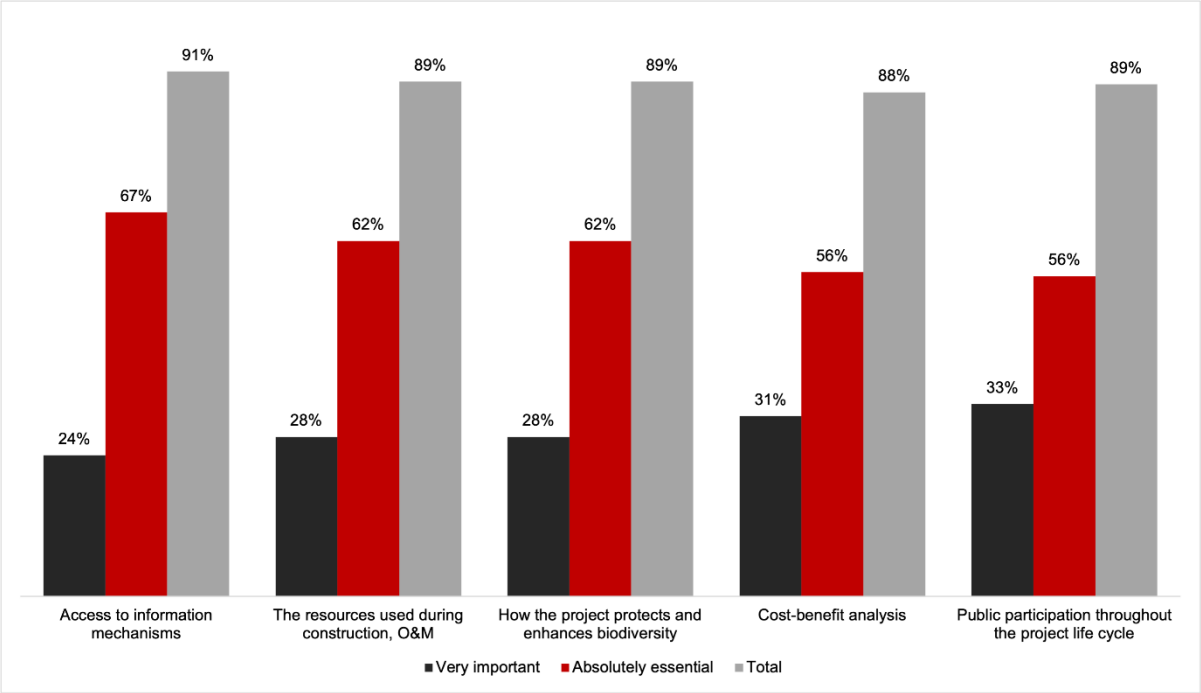
In the focus groups, civil society participants highlighted the importance of long-term development plans. Transparency around these plans was considered essential to give full visibility to citizens on countries' commitments in areas such as environment and climate obligations, ensuring that money is invested in sustainable projects. The alignment between projects and plans was also considered key to guarantee that priorities are put on the most critical issues. An example provided during the discussions related to investing in recreation facilities when basic sanitation is still lacking. Aligning projects with long-term plans would help governments to prioritize according to the most pressing social needs. The importance of municipal plans was also raised, which would be relevant to ensure consistency between local and national projects.

In terms of data availability, civil society stakeholders in focus groups highlighted that data should be published in country portals so that the information can be easily accessible by citizens. The risk of national data being lost if they are stored in local portals was mentioned, which could occur in cases of military or terrorist action leading to the destruction of local servers, for example. From the discussions it transpired the

importance of considering issues of permanent access to data to devise long-term information technology strategies that are reliable.

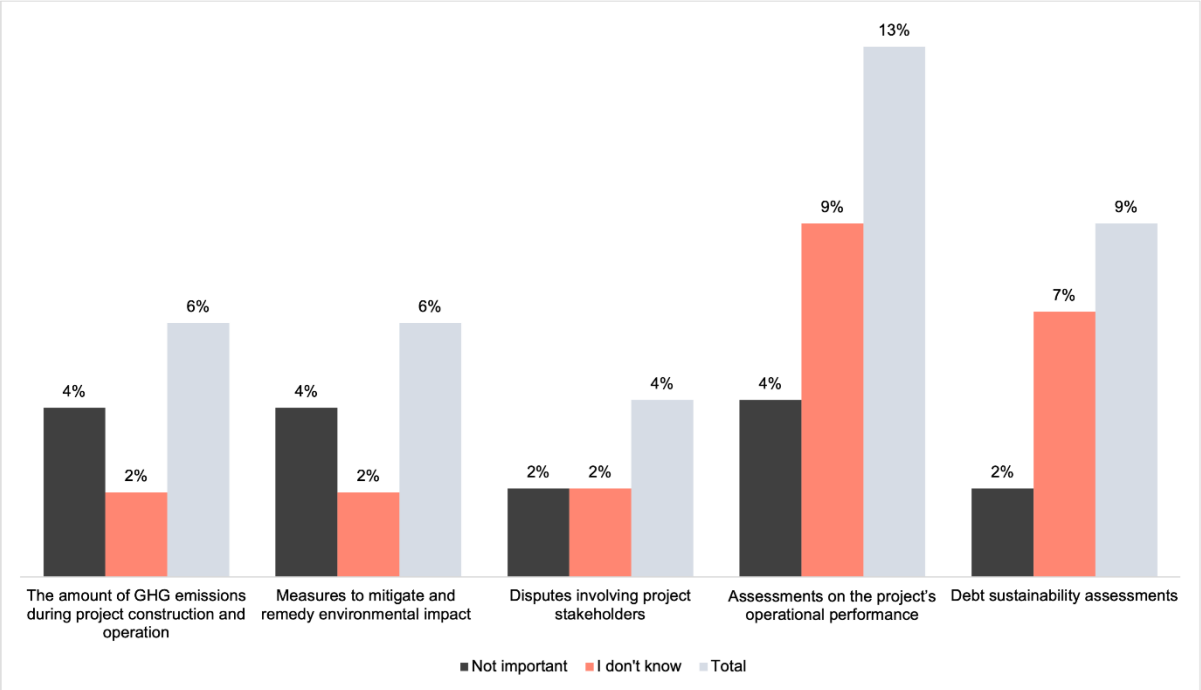
Figures 5.3 and 5.4 summarize the highest and lowest priority sustainability indicators for civil society respondents. The full results from civil society respondents are shown in Figure D.4 in Appendix D.

Figure 5.3 Civil Society Highest Priority Sustainability Indicators



Source: World Bank, CoST and Open Data Services.

Figure 5.4 Civil Society Lowest Priority Sustainability Indicators



Source: World Bank, CoST and Open Data Services.

5.2.3 Private Sector

There were similarities among indicators selected by the private sector respondents and the opinions of those from government and civil society. Strategic planning indicators, for example, were considered of high importance by the private sector. Alignment of projects with the national development plan or strategy was ranked as a top priority, coinciding with government opinion.

In focus group discussions, participants stressed the relevance of infrastructure plans and policies to provide clarity on long-term public goals, allowing businesses to prepare in advance on how to respond to future projects. National and sector plans were both considered essential. Knowing public goals in advance would provide an opportunity for the private sector to plan accordingly and participate in the implementation of such strategies.

Participants also highlighted the importance of "knowing what is on the table for discussion", and what members of parliament and politicians are discussing in terms of infrastructure for the next 10–20 years. Participants mentioned that "knowing the reasons why projects are selected" would be critical, as much as understanding how beneficiaries would be reached by the selected projects. Clear planning was emphasized as a way to identify potential conflicts of interest in project selection. Participants referred to the need of "knowing whether projects are selected by convenience and interests" and having means to assess if project choices are made without synergies and complementarities due to undue influence. Long-term plans would therefore work as benchmarks, offering a comparative metric to assess whether planning goals have been met. Despite valuing transparency in the development of national plans, lobbying activities were considered as having lower importance by the private sector.

Economic and financial indicators were rated by the private sector in a similar way to civil society. This was the case in value-for-money assessment and project funding and financing sources, which indicates a focus on the economic sustainability of infrastructure. On health and safety, the private sector indicated compliance with safety regulations and building codes as a priority for publication (in sixth place), sharing with civil society the same concerns around the quality and stability of infrastructure assets.

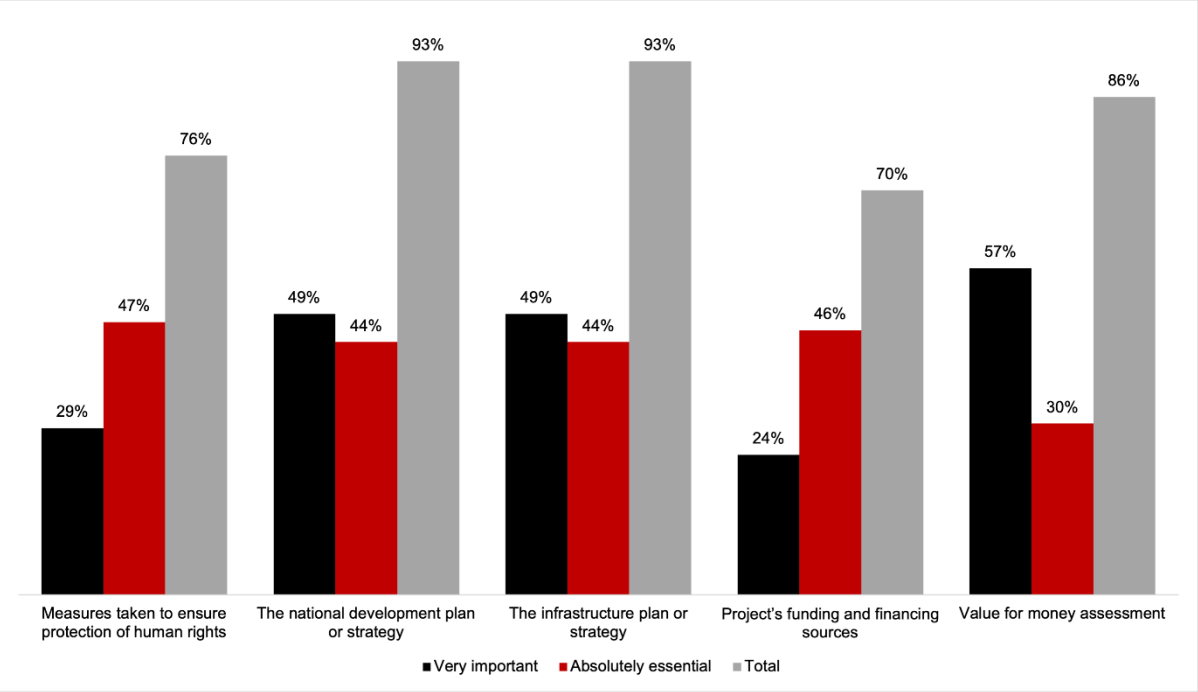
An indicator that was only highlighted by private sector respondents related to measures to ensure compliance with human rights and construction workers' rights throughout the supply chain, which had a particular significance among Latin American respondents. In focus groups, private sector participants raised the issue of competitiveness as a key reason for selection. Transparency around human and workers' rights compliance would be a fundamental measure to ensure a level playing field in the sector and avoid unfair employment practices by contractors.

Environmental and climate related indicators ranked with lower importance when compared to other indicators. The amount of greenhouse gas emissions and climate related transition plans associated with a project were considered to be lower priorities. This mirrors the view of civil society and contradicts the importance attributed to these indicators in the expert interviews. Echoing government opinions, debt sustainability assessments were considered least important for the private sector. In the focus

groups, however, participants did highlight life-cycle costing concerns and the importance of operation and maintenance expenditure for project sustainability.

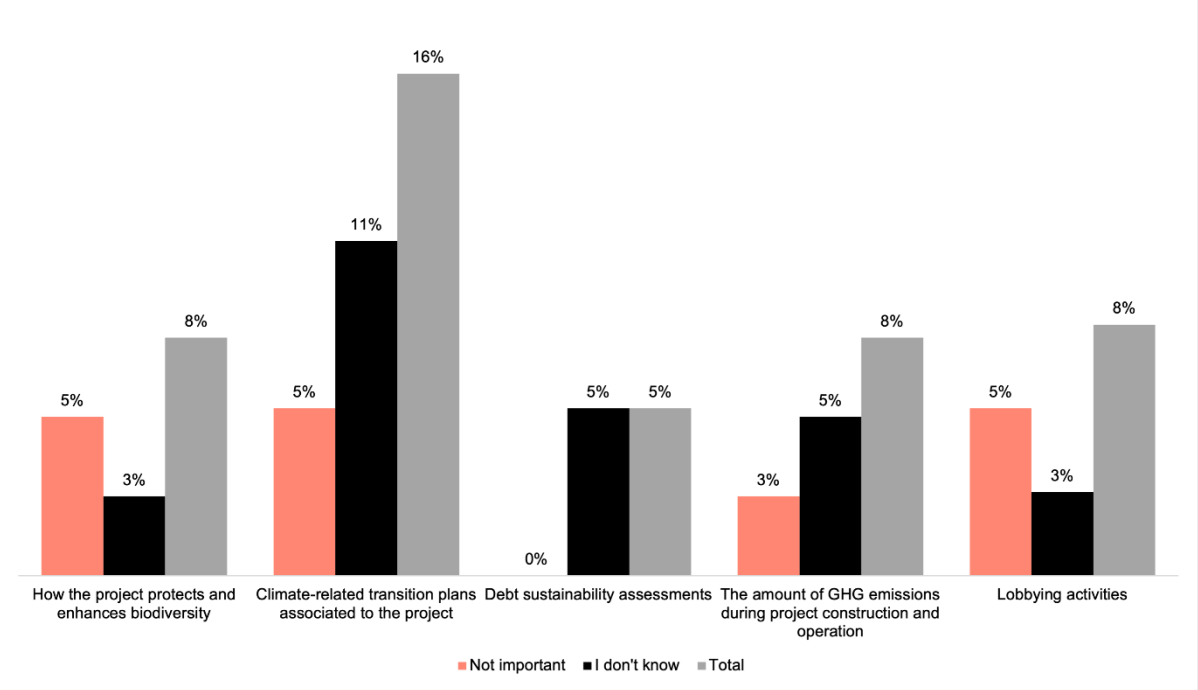
Figures 5.5 and 5.6 summarize the highest and lowest priority sustainability indicators for civil society respondents. The full results from private sector respondents are shown in Figure D.5 in Appendix D.

Figure 5.5 Private Sector Highest Priority Sustainability Indicators



Source: World Bank, CoST and Open Data Services.

Figure 5.6 Private Sector Lowest Priority Sustainability Indicators



Source: World Bank, CoST and Open Data Services.

5.2.4 Media

Access-to-information mechanisms and public participation throughout the project life cycle received the highest scores of "absolutely essential" among the group of media respondents. Although a small sample, with only 16 respondents, this was an important consideration, particularly in the light of the countries of residence of the respondents, which included high-risk regions for journalists such as Russia, China, Uganda, and Honduras.

The group also demonstrated an interest in environmental and social indicators. Project exposure to climate related risks and measures to mitigate and remedy environmental impact were key priorities. Equality of employment and job generation were social aspects highlighted by the group in the joint sixth and joint twelfth positions.

On the financial side, the group attributed high importance not only to short-term project costs, as in the case of the disclosure of cost-benefit analysis in the joint sixth position, but also to fiscal aspects. Information on the state of public finances impacted by the project was ranked with the same level of importance as the project's funding and financing sources, in the joint twelfth position. This was in sharp contrast to the other groups where fiscal impacts were ranked with lower importance. Also, media respondents were the only group to prioritize the four areas of sustainability.

In the focus groups, the importance attributed to cost-benefit analysis was considered in view of the need to justify project selection. This information would allow media professionals to assess whether projects were a necessity given country priorities. Similar to private sector, media respondents understood the value of long-term plans as an "umbrella concept" that would help to benchmark project implementation and compare policy goals with project achievements. Infrastructure plans and strategies had the highest overall rate in the survey results.

Market concentration and information on contracting parties were raised during the focus group discussions. Participants considered this to be key information to "connect the dots" between big players in the sector and awards given to the same contractors. Beneficial ownership information was mentioned in this context. Participants considered that data on legal and beneficial structures of contracting parties would provide clarity on potential linkages between politicians and companies receiving contract awards.

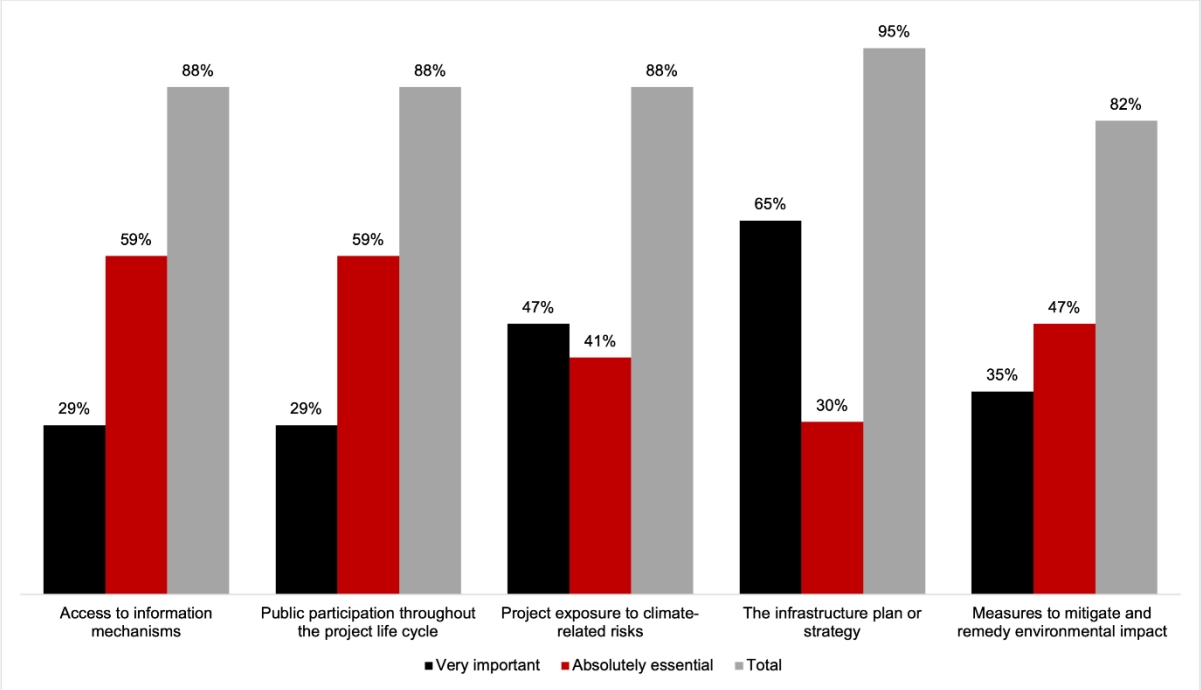
Open data format was mentioned as the preferable way to assess information, which would allow the quick processing of large volumes of data. Information on environmental licensing, deforestation, climate impact, and subcontractors in the supply chain were examples of areas with low visibility that would benefit from additional transparency. Artificial intelligence tools – such as Google's Pinpoint[2] – that convert files and allow data visualization were considered of high importance to transform data into meaningful information. Ensuring effective transparency of information was referred as a key challenge in some contexts, even in the presence of access-to-information laws which, according to participants, can be maneuvered to delay publication of critical information. Finally, mirroring the position of other groups,

[2] https://newsinitiative.withgoogle.com/en-gb/resources/trainings/pinpoint-a-research-tool-for-journalists/

media respondents also considered the amount of greenhouse gas emissions to be less important in comparison with other priority indicators.

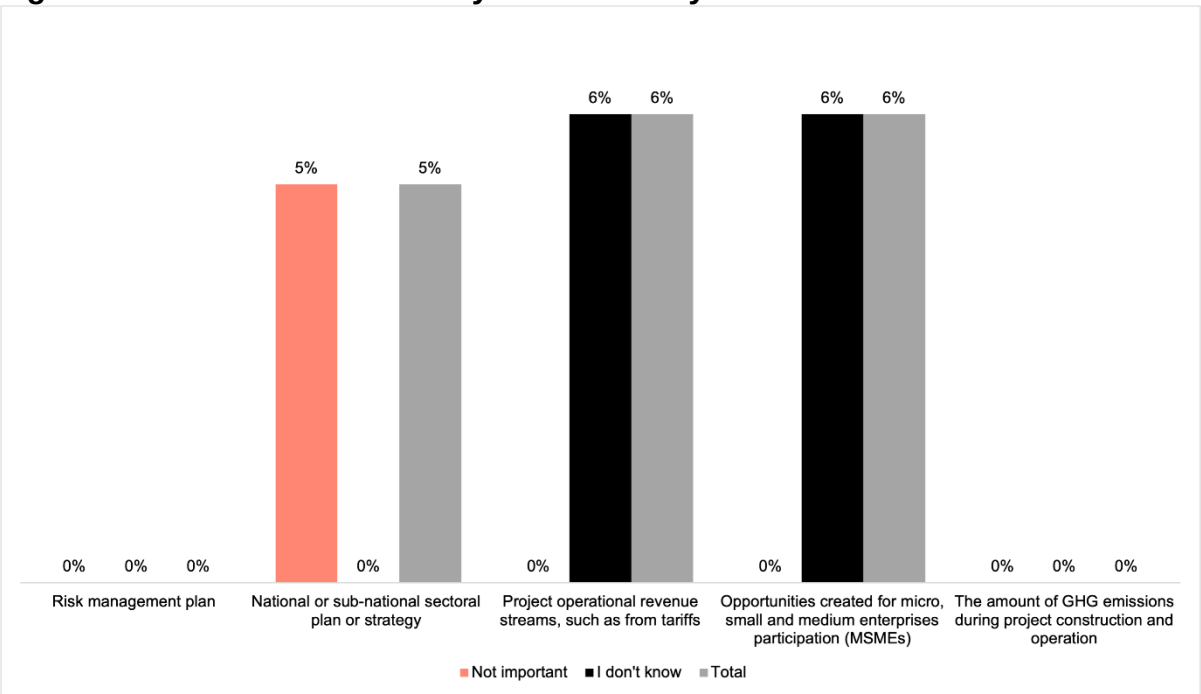
Figures 5.7 and 5.8 summarize the highest and lowest priority sustainability indicators for media respondents. The full results from media respondents are shown in Figure D.6 in Appendix D.

Figure 5.7 Media Highest Priority Sustainability Indicators



Source: World Bank, CoST and Open Data Services.

Figure 5.8 Media Lowest Priority Sustainability Indicators



Source: World Bank, CoST and Open Data Services.

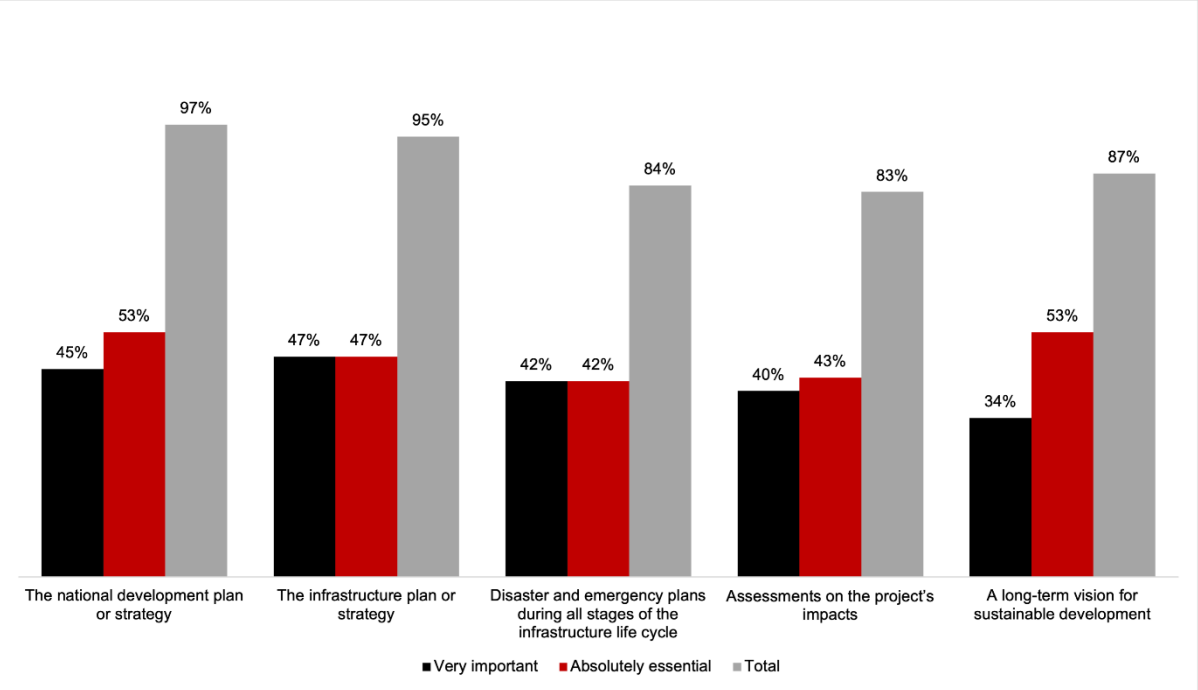
5.2.5 International Financial Institutions

Strategic planning indicators were ranked highly by respondents from international financial institutions. Three out of the top five priorities related to long-term strategies, including national, infrastructure, and sustainable development plans (Figure 5.9). Lobbying activities and greenhouse emissions were among the lowest priority indicators (Figure 5.10).

The small response rate, with only 37 survey answers, should be considered when assessing the international financial institution results. It is also important to note that 10 respondents out of the 37 skipped the question related to climate finance indicators, which could be interpreted as a potential lack of knowledge on the topic and could help explain that climate specific indicators had less representation in the overall results among international financial institution respondents.

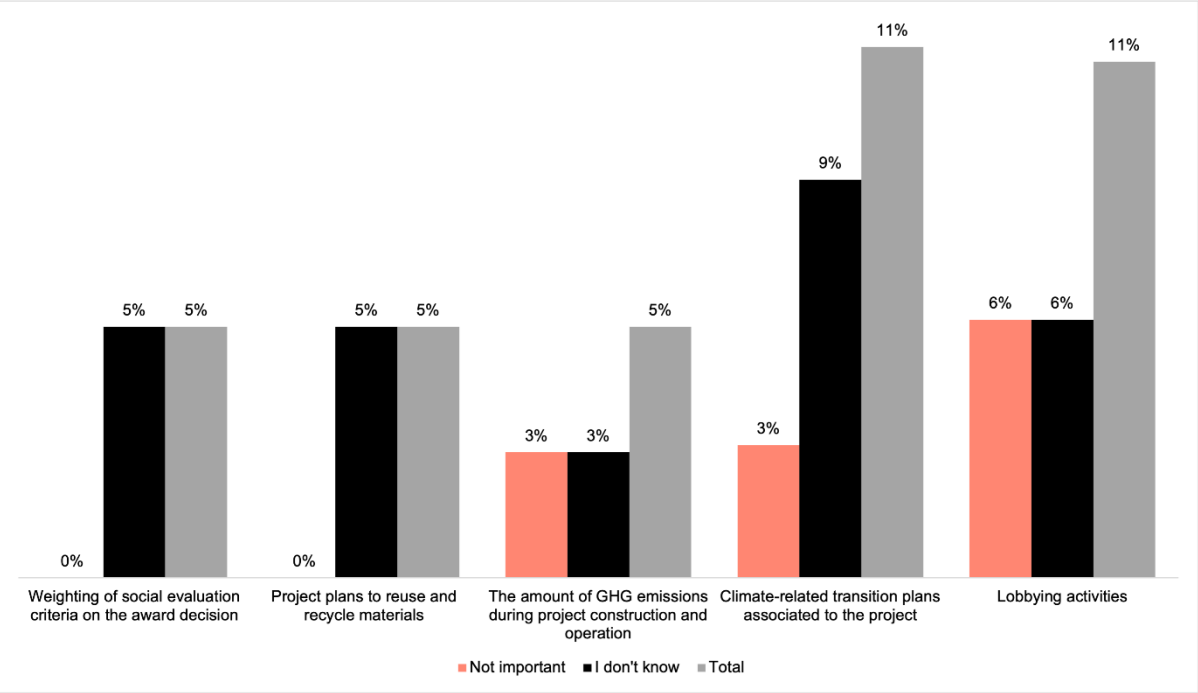
The full results from international financial institution respondents are shown in Figure D.7 in Appendix D.

Figure 5.9 International Financial Institution Highest Priority Sustainability Indicators



Source: World Bank, CoST and Open Data Services.

Figure 5.10 International Financial Institutions Lowest Priority Sustainability Indicators

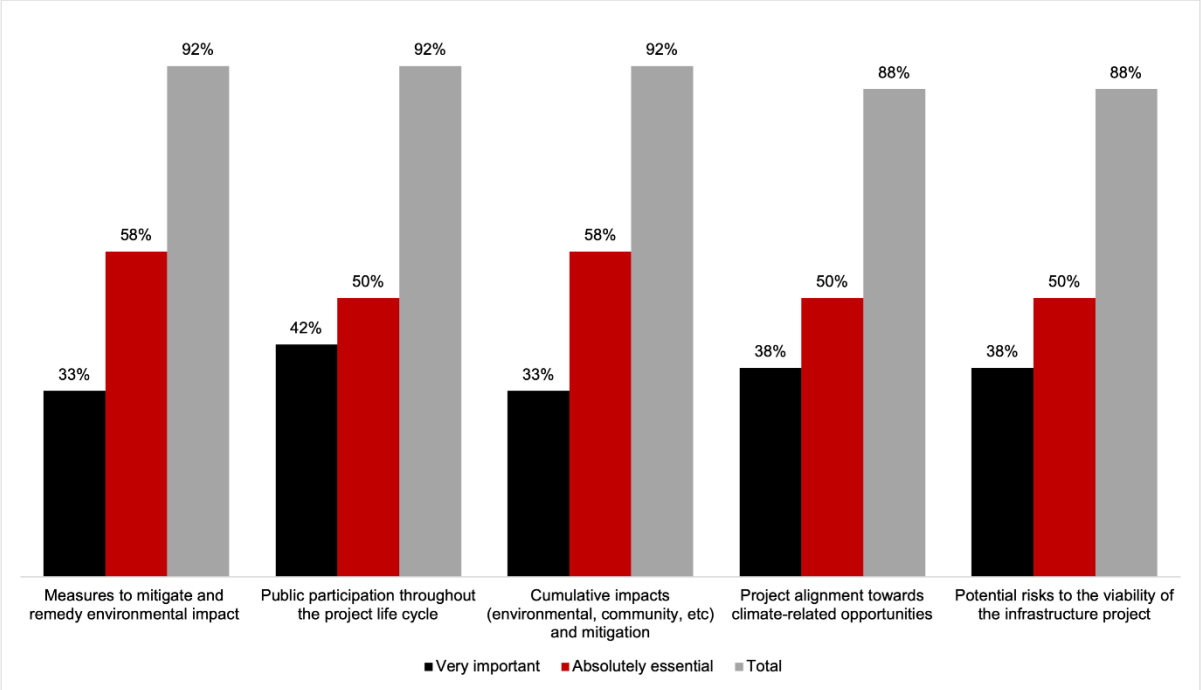


Source: World Bank, CoST and Open Data Services.

5.2.6 Academia

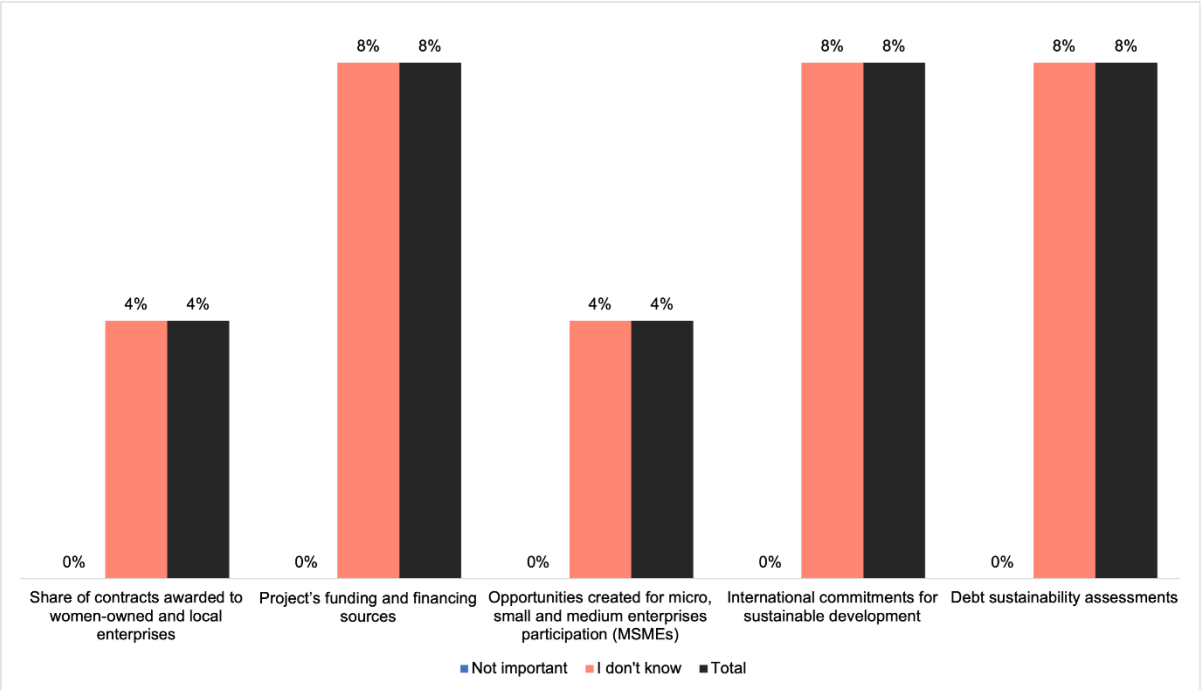
Academia was the group where environmental and climate indicators received the highest attention, which is consistent with respondents with technical knowledge on the matter (Figure 5.11). On the lowest priority indicators, debt sustainability assessment was common with other groups (Figure 5.12). The full results from academia respondents are shown in Figure D.8 in Appendix D.

Figure 5.11 Academia Highest Priority Sustainability Indicators



Source: World Bank, CoST and Open Data Services.

Figure 5.12 Academia Lowest Priority Sustainability Indicators



Source: World Bank, CoST and Open Data Services.

5.2.6 CoST Members

To capture the position of CoST members and allow comparison with external groups, an internal focus group was carried out with CoST stakeholders. This included program managers, assurance professionals, and members of multi-stakeholder groups across different countries, including Costa Rica, Ecuador, Guatemala, Ghana, Mexico, Puerto Rico, Panama, Thailand, and Uganda.

CoST stakeholders stressed the importance of beneficial ownership to improve transparency and help address issues of conflict of interest. According to the participants, beneficial ownership publication should include contractors, subcontractors, and any advisors and actors involved in the design and decision-making process of priority projects. This is consistent with views in the expert interviews, where issues of beneficial ownership transparency were highlighted as important to understand power relations in the sector.

Although conflict of interests was named by CoST stakeholders as a main purpose for beneficial ownership publication, transparency around the corporate structure of bidding companies was also mentioned. This is vital to clarify the percentage of procurement attributed to special categories in procurement, as in the case of women, local businesses, and people with disabilities. Transparency around this was justified as aligned with current views of using procurement to support social goals.

Citizen participation was a second area of importance named by CoST stakeholders. In some contexts, participation can be ensured by legal frameworks, such as through the Office of the Prime Minister and the Procurement Law in Uganda, or a tradition of activism in Latin American countries. But stakeholders stressed that high-level infrastructure plans are frequently decided without citizen participation, and thus communities often disagree with what should be prioritized. Ensuring meaningful participation, including in decision-making stages, was a noted challenge.

Impact of projects was another area mentioned as a priority. Although some countries do undertake evaluation of projects when construction is completed, the scope of these evaluations is often limited to engineering outputs rather than establishing how projects have helped beneficiaries and communities. Specific outcome indicators to guide procuring entities in impact evaluation was referred to as important to provide support for a better mapping of long-term and sustainable impact.

In the context of project impact, CoST stakeholders also indicated the need for information regarding the project beneficiary population. In addition to transparency of the number of direct beneficiaries, socioeconomic conditions and a disaggregation by gender were considered important metrics. Some members confirmed that they have already been collecting this information through the CoST assurance process.

In relation to data practices, two key points were addressed during the discussion. First, issues of lack of information, mostly related to environmental assessments. In many Latin American jurisdictions, environmental impact reports are legally required for major infrastructure projects and public–private partnerships, but exceptions to this requirement are often given to speed up construction projects. Clarity on these situations could help assess and mitigate environmental risks. Second, participants raise the issue of mandating publication of indicators that are not legally binding, which could increase the risks of non-disclosure by procuring entities. Considering legal

requirements and balancing what is important and what is feasible was a key message from CoST stakeholders to ensure traction of new data points.

5.3 Overall Findings

The findings indicate competing priorities. While common interests were identified, such as in relation to the alignment with national development plans or strategies – which was identified by government, civil society, and private sector respondents – clashes were also notable. Biodiversity and climate indicators are key examples. Civil society was the only survey group to highlight biodiversity as a priority area for sustainability, whereas climate finance indicators were only emphasized by academia and experts in the in-depth interviews. CoST members and international financial institutions were the two groups that identified the assessment of project impacts as a priority issue for sustainability, and labor rights were only raised by the private sector among all groups of survey respondents.

The three indicators which ranked with the lowest level of importance across the different groups of stakeholders surveyed were: lobbying activities, which had the highest rate of “not important” in the aggregate analysis; project plans for net zero; and debt sustainability assessments. The full results for “not important” answers are shown in Figure D.9 in Appendix D. The last two indicators also coincided with the highest levels of “I don’t know” answers, which shows a lack of knowledge by the survey respondents on these matters. The full results for “I don’t know” answers are shown in Figure D.10 in Appendix D.

In the aggregate analysis, climate finance indicators received one of the lower importance rankings in comparison with other thematic areas, though these areas were considered as priority by the experts in the interviews. The aggregate analysis of all responses by thematic areas of indicators is shown in Figure D.11 in Appendix D.

Combining the responses, the priorities can be summarized as follows:

- **Economic and financial sustainability**: The survey indicated a priority on short-term indicators, such as cost-benefit analysis, value-for-money assessments, resources used during implementation, operation and maintenance, risk management plans, and clarity on funding and financing sources. Experts highlighted financial aspects such as debt assessments, life-cycle costing, and long-term budget implications of projects.
- **Environmental and climate sustainability**: Survey responses pointed to measures to mitigate and remedy environmental impacts, disaster and emergency plans, biodiversity measures, assessment of project exposure to climate related risks, and climate related opportunities of projects. Experts emphasized the value of objective metrics such as greenhouse gas emissions and net zero commitments to benchmark the sustainability of future projects.
- **Social sustainability**: The survey identified health and safety indicators such as compliance with construction workers’ rights and transparency around safety regulations and building codes as priority areas. Assessments related to the beneficiary population (including gender and disabilities), the project long-term

impact, and inclusive designs were highlighted by CoST members and experts in the interviews.

- **Institutional sustainability**: Access to information, public participation, and alignment with different levels of policy documents – such as national development plans, infrastructure plans and a long-term vision for sustainable development – were identified as priority indicators by survey respondents. CoST members, media, and experts also stressed the importance of beneficial ownership information and conflicts of interests in decision-making.
- **Climate finance**: Climate financing indicators received one of the lower importance rankings in the survey but were considered a key thematic area in the expert interviews. Highlighted areas include the quantum and quality of climate finance for infrastructure, accessibility, planning and decision-making processes, results towards a positive impact of climate finance, co-benefits and transition to low carbon economies.

6. Desk Review of Sustainability Data Supply

6.1 Overview

Desk research was carried out to understand further what data is being published on sustainable infrastructure. This was done by selecting a sample of 10 countries covering a range of different regions, sizes, languages, income groups, and development levels.[1]

For each country, key national or federal government agencies responsible for sustainable infrastructure procurement were identified, or the key agencies responsible for publishing data relating to sustainable infrastructure, to collect examples of data publication. Ten supranational agencies[2] were also selected, with their websites searched for relevant datasets. In addition, experts were consulted in related areas to identify additional relevant datasets. The findings of the review are detailed in Appendix E.

After the review, the datasets identified were categorized in five groups:

1. **Details on projects funded by international financial institutions:** These datasets provide high level project information and focus on financial aspects of these projects. Several datasets also include climate finance related information, such as the concepts of climate change mitigation and climate change adaptation.
2. **Procurement datasets**: Some of these are in Open Contracting Data Standard (OCDS) format, but many are not.
3. **Development indicator metrics provided at a country level**: This was the case of databases to inform on progress related to the United Nations Sustainable Development Goals (SDGs) for example.
4. **Geospatial data designed to be used within mapping tools**: These datasets primarily focus on environmental information.
5. **Beneficial ownership datasets**: Only three of the 10 countries included in the analysis publish information related to the beneficial ownership of companies: Indonesia, Albania, and the United Kingdom. Only the latter, however, publishes this as a discrete, searchable dataset.

6.2 Overall Findings

An important finding was the difficulty data users have in identifying and accessing relevant open data in sustainability issues. Many of the sources mentioned by participants are not publicly accessible without registration and/or payment. Many

[1] Albania, Algeria, Colombia, Indonesia, Malawi, Mexico, Nepal, South Africa, Thailand, and the United Kingdom.

[2] The World Bank, The Inter-American Development Bank, The African Development Bank, The Asian Development Bank, The United Nations, The European Union, The European Bank for Reconstruction and Development, Dutch Entrepreneurial Development Bank, German Investment Corporation, and the Organisation for Economic Co-operation and Development.

governments do not have a central department or repository that collates and publishes all the data relevant to sustainable infrastructure.

Where a dataset does mention infrastructure sustainability, it tends to deal with just one type of project, such as healthcare or water infrastructure. With the exception of broad and high-level fields – for example “project name”, “description”, and “country” – sustainability data fields appear to be quite specific to the project type.

Despite little standardization across the datasets examined, there are fields that can be standardized and made compatible with the CoST Infrastructure Data Standard (CoST IDS) and the associated Open Contracting for Infrastructure Data Standards Toolkit (OC4IDS) fields, as follows:

- Projects can be classified according to the SDGs and SDG targets.
- Additional subsectors can be included when benchmarking sustainability, such as renewable energy.
- Additional classification can be included to clarify whether infrastructure considers climate change mitigation or adaptation measures.
- Beneficial ownership data is not yet widely available, but links can be created to connect beneficial ownership and OC4IDS datasets.
- Geospatial data has the potential to be linked with or referenced in OC4IDS. Information such as whether a project overlaps with conservation and protected areas can be collected based on location information already recorded within the CoST IDS and OC4IDS fields.

7. Challenges Arising from Findings

A key outcome of the stakeholder engagement and data supply review was the identification of challenges that impacted the analysis. These issues are detailed below and relate mostly to data standardization matters and difficulties in capturing sustainability risks.

7.1 Data Disclosure

Data fragmentation was a common issue raised by the participants. Stakeholders of different groups highlighted that infrastructure data is siloed, scattered, and difficult to find, which makes it harder to develop a centralized approach to sustainable infrastructure.

Stakeholders do not think that data is – or has been – intentionally withheld by public authorities. It is rather operational issues that seem to be the main reason leading to data fragmentation. Departments and ministries within the same government have internal challenges to share information and databases with each other. The common case cited was environmental data that tends to be stored within environment protection agencies and rarely communicated to entities in charge of procurement.

The fact that data is not published in real time was another issue raised. Reasons mentioned included confidentiality of certain tender rules as well as security issues. The lack of publication systems and information technology experts within procuring entities were also identified as potential contributors to the problem. When data is made available, projects have often already been approved and important decisions passed, which limits the opportunities of engagement, oversight, and accountability.

Participants also raised instances where data standards can be misunderstood by procuring entities. Issues of language were mentioned as a potential contributor, more specifically when the wording applied by indicators and data points may not be closely aligned with procurement legislation jargon and practice. This highlights the challenges of data standardization and the need for carefully wording the data points to avoid reputational risks of misrepresentation and ensure adequate understanding and compliance by procuring entities.[1]

7.2 Alignment of Projects with Long-Term Plans

Across government, the private sector, civil society, media, and international financial institutions, the alignment of projects with development plans and strategies was a high-ranking item in the stakeholder survey. The reasons raised in focus groups varied. For governments, it was the need to ensure conformity between projects and plans. Visibility on public commitments was the reason argued by civil society, while

[1] Data collection challenges were also raised by stakeholders engaged during the peer-review period. Difficulties to collect data, due to the costs involved and the geographic dispersion of project documentation, were considered an important barrier for data disclosure.

for the private sector this was considered as key information to help companies plan their activities.

Requesting information on countries' plans and strategies would also offer an objective measurement to assess the integrity of the decision-making process. Projects chosen outside these lines could raise red flags around project selection. From a fiscal perspective, transparency around plans and strategies can give clarity on long-term commitments, which is particularly important for multiyear projects.

Despite the value of requesting disclosure of development plans and strategies, a challenge exists on how this alignment is to be measured. During the engagement process, binary options to ascertain projects' alignment with long-term goals were considered problematic. This is because a "free text" or a "yes/no" type of answer could induce empty responses from procuring entities if no documental backing is presented to ensure alignment with long-term plans is not just hypothetical.

In addition to the disclosure of policies and plans, using certification systems to assess a project's alignment with sustainability goals – such as SOURCE,[2] FAST-Infra,[3] the Blue Dot Network,[4] and ISO certifications – was mentioned in the expert interviews as reliable metrics to bring a layer of objectivity to this assessment.

7.3 Broad View of Project Location

The engagement process pointed to the need for updating the concept behind "project location". More than a data point that indicates longitude and latitude, location should cover the extended area of the project impact. This should reflect an infrastructure systems perspective and include ecosystem and biodiversity concerns as well as social impacts on communities and the supply chain.

A broader view of project location has many implications. From an ecosystem perspective, this means taking into account conservation areas that could be affected by a project as well as impacts that may exist in terms of habitat fragmentation flowing from the project, such as deforestation, noise, and pollution. It also requires considering climate hazard predictions throughout the entire area of project influence (for example the entire course of a river in the case of a hydropower plant), coupled with the assessment of impacts of those hazards on the future operation of the asset.

From a social perspective, this means understanding ripple effects more broadly. Having clarity, for example, on land use patterns throughout the extent of the area impacted by the project, and how land use and land availability may change before resettlement and relocation are decided.

It also means mapping areas where materials and work are sourced from, so it is possible to uncover potential hidden risks of the project. A supply chain geography can help reveal hidden stakeholders of the project – such as informal subcontractors

[2] https://public.sif-source.org/source/

[3] https://www.climatepolicyinitiative.org/fast-infra-sustainable-infrastructure-label/

[4] https://www.oecd.org/daf/Towards-a-global-certification-framework-for-quality-infrastructure-investment-Highlights.pdf

and communities impacted by migration influxes of workers – as much as hidden opportunities for circularity approaches and synergies with other infrastructure assets. This "landscape view" of the project location – as it was termed by one stakeholder – should be able to capture the expanded geographic radius of the project impact. A challenge exists, however, on how to capture this "area of influence"[5] for a variety of different projects.

An alternative could be to select one example, such as conservation. Overlaying maps and available datasets is a potential data use that can derive from an extended understanding of the project location. As identified in the data supply review, conservation datasets available in the Integrated Biodiversity Assessment Tool,[6] which contains free visual maps with protected areas and key biodiversity areas, can provide valuable uses to help identify the effective area of influence of projects. This could strengthen conservation indicators recently identified by WWF and Open Contracting Partnership (WWF and OCP 2023).

7.4 Impact of Projects

Both in the focus groups and in the expert interviews, the topic of measuring impact was identified as critical for an assessment of sustainability. Assessing impact – and not only engineering outputs – can provide the evidence backing to demonstrate that projects are aligned with long-term goals and commitments. And, as raised by stakeholders, demonstration of impact can also help justify why projects have been selected and prioritized in the first place.

CoST members reported that in their experience official impact assessments carried at the end of project execution tend to fall short in terms of establishing how projects have effectively contributed to improve beneficiaries' and communities' lives and livelihoods. The assessment is often an engineering analysis to check whether the technical requirements of the project have been met.

Challenges would exist however to develop data points that are able to capture a broad range of potential economic and social impact related to a variety of different projects. Jobs and ripple effects on growth were two metrics mentioned in the interviews as useful indicators on this regard.[7]

7.5 Beneficiary Population

The number of direct beneficiaries tends to be the common metric used by procuring entities in the appraisal and planning stages of infrastructure. Knowing additional details of the beneficiary population, such as the socioeconomic conditions, gender segmentation, and future service provision needs, would be relevant for additional

[5] This expression has been used by planners to define the zone of project impact beyond the immediate location, see CEPAL https://observatorioplanificacion.cepal.org/sites/default/files/methodology/Guia%20infraestrutura%20vial.pdf.

[6] https://www.ibat-alliance.org/

[7] Trade and mobility impact were metrics raised by stakeholders during the peer-review period.

accountability on decision-making and better policy prioritization. This would have importance also for the climate finance data points to identify clearly who the climate finance investment is intended to benefit.

The number of beneficiaries is most likely to be information included in the appraisal documents and can be manually extracted from these documents. Poverty and gender data, on the other hand, will face more challenges to be included unless the procuring entity collects this information on a segregated basis.

7.6 Beneficial Ownership

Beneficial ownership is a building block for transparency on issues related to undue influencing and power relations. But in the interviews, experts stressed the need of having clarity on the reasons for disclosure of beneficial ownership information and not endorsing a “transparency for transparency’s sake” approach.

The challenge is that most countries still do not disclose information on companies’ registries. Central repositories of beneficial ownership information can also exist in some countries, but they may not be publicly accessible (that is, a part-open registration system).

Infrastructure is also a unique type of procurement, with characteristics that are not replicable. For example, once contractors are named in projects, there would be a strong link to advocate for transparency of legal and beneficial information. However, the issue would arguably become more problematic as subcontractors are downstream in the supply chains, where the link to public resources can get weaker.

Using available registries and relying on unique identifiers attributed to companies is essential to ensure data integration between available registries and the CoST Infrastructure Data Standard (CoST IDS) and associated Open Contracting for Infrastructure Data Standards Toolkit (OC4IDS).

7.7 Health and Safety

The challenge related to health and safety is to find documental evidence of labor compliance, particularly in view of the sector informality and high level of industry fragmentation. A possible test of labor conformity raised in the interviews is to assess whether labor rights have been adequately priced in project budgets and bid proposals. This would turn a hard-to-quantify issue into a planning matter that could be assessed through document analysis during tender. A second test of labor compliance raised in interviews would be to identify whether labor obligations provided in the procurement documents have been written into the specific project contracts. Publishing data on the number of accidents and fatalities on site was also considered a straightforward metric to gauge health and safety risks on construction sites.

7.8 Disaster Mitigation

Disaster mitigation experts raised the issue of monitoring. Regulation on stability of construction is normally strong on paper, but monitoring and enforcement tends to be

weak. Two critical aspects identified in interviews were the disclosure of construction materials testing and the names of building inspectors. Absence of materials testing could be a red flag for inadequate quality processes. The latter, on the other hand, would be important for accountability purposes and for professional misconduct responsibility. No public databases seem to exist on these two matters, so data collection would rely exclusively on information provided by procuring entities.

Disaster mitigation was also a topic linked to the project location given the impact of climate hazards on the safety of construction. Data on climate predictions was raised in the interviews as essential for responsible design. Cross-referencing climate hazards and the project location can provide use cases to identify infrastructure at risk. Experts also mentioned that climate and disaster impact can be intangible to demonstrate, at least until a disaster occurs with drastic consequences. Demonstrating to people the knock-on effect of building in risky areas, by overlaying maps of project locations and climate predictions, could encourage authorities to strengthen responsible planning.

7.9 Greenwashing and Social Washing Risk

The risk of greenwashing and social washing was a concern during the analysis. The challenge was to capture sustainability issues without generating blank statements that could be used by procuring entities to generate misleading or false declarations. This would emerge in the absence of proof to substantiate claims presented by procuring entities, for example in claiming how projects align with policies and plans or contribute to any specific sustainability goals. The issue would also arise in the identification of measures adopted by projects to ensure climate and biodiversity protection and to evidence the extent to which designs are inclusive and gender positive. Requesting evidentiary basis of claims and using explanation fields in the modeling of the data points are ways to mitigate such risks.

7.10 Low Scoring Items: Lobbying Transparency and Fiscal Assessment

Lobbying was an item that scored low in comparison to others in the survey. During the expert interviews, however, experts raised the need to better understand the dynamics of project selection and decision-making so that undue influence and conflicts of interest could be properly managed.[8]

Undue influence in project decision-making can lead to many distortions. From the selection of inappropriate project solutions to locations that do not match urgent needs[9], there are multiple adverse consequences that can derive from the lack of oversight in decision-making. Opening the black box of decision-making can help bring transparency and clarity around these matters.

[8] The need to strengthen indicators and data points in the early stages of project development was emphasized during the peer-review period.

[9] https://www.institute.global/insights/tech-and-digitalisation/infrastructure-geomapping-unlocking-new-uses-governments-and-citizens

Although lobbying is not an activity regulated and formalised in many countries, lobbying terminology can provide a valuable framework to capture grey areas in decision-making. By using concepts that have been defined by lobbying experts, such as the International Standards for Lobbying Regulation, the new data points can dialogue with this thematic area and therefore be ready to connect with lobbying registries when they become available. The dialogue can also provide a common denominator to understand interested group influence in project decisions.[10] The goal is to stimulate entities to understand risks associated with undue influence and conflict of interests and publish information on meetings held with interest parties on infrastructure projects.

Items related to fiscal sustainability, such as debt assessment and whole life-cycle costing, also scored low and were considered only slightly important by most stakeholders in the survey results. Experts, on the other hand, highlighted the importance of these items to ensure long-term sustainability of projects and compliance with budgetary commitments. Multi-year projections are a relevant way to capture fiscal aspects of a project.

[10] On this regard, see U4 definition of interest groups: “Interest groups are associations of individuals or organisations that on the basis of one or more shared concerns, attempts to influence public policy in its favour usually by lobbying members of the government. Interest groups influence on policy making is not a corrupt or illegitimate activity per se, but a key element of the decision-making process. However, disproportionate and opaque interest group influence may lead to administrative corruption, undue influence, and state capture, favouring particular interest groups at the expense of public interest” (U4, Influence of interest group on policy-making, https://www.u4.no/publications/influence-of-interest-groups-on-policy-making).

Part III: Developing New Data Points

8. Sustainable Infrastructure Data Points

8.1 Data Points

Based on the stakeholder engagement (survey and interviews) and data supply review, a set of 45 sustainable infrastructure data points are proposed to be tested as thematic modules of the CoST Infrastructure Data Standard (CoST IDS) and associated Open Contracting for Infrastructure Data Standards Toolkit (OC4IDS).

The data points cover the whole project cycle, from decision-making to decommissioning, and consider what is feasible and practical in terms of data availability. They take into account data and information that procuring entities and governments already tend to collect and which could be repurposed to foster sustainable infrastructure procurement.

The data points also consider a prospective approach, looking at data that will provide evidence to assist procuring entities in reaching the next level of infrastructure sustainability. Greenwashing and social-washing risks were also considered in the way the data points are worded to avoid blank statements not grounded in evidence. The data points are designed to work as optional modules of the CoST IDS and the OC4IDS and can be adopted by countries and procuring entities for a deeper understanding of sustainability of their infrastructure investment.

The data points are shown grouped by theme (economic and financial, environmental and climate, social, and institutional) in Tables 8.1 to 8.4. For each data point, the corresponding CoST IDS module, indicator, and project stage are shown together with a description of the disclosure requirement. References to other standards and definitions employed in the modeling of the data points are indicated for consistency and interoperability across datasets.

Table 8.1. Economic and Financial Data Points

CoST IDS module	CoST IDS indicator	Data point (CoST IDS project stage)	Disclosure requirement
Economic	Procurement viability	Procurement strategy (identification)	Disclose the procurement strategy risk assessment. This tends to be part of the decision-making strategy and likely includes discussions regarding capabilities, the delivery model and the rationale for the risk allocation decision.
Economic	Economic viability	Life-cycle cost (preparation)	Disclose the life-cycle cost of the project, which is the cost of an asset throughout its life cycle while fulfilling the performance requirements.[1]
Economic	Economic viability	Life-cycle cost calculation methodology (preparation)	Disclose the methodology used to calculate the life-cycle cost. The methodology ought to specify whether income and externalities are included in the calculation and the common date, discount rate and period of analysis used.
Economic	Economic viability	Funding source for preparation, implementation, and maintenance[2] (across the project cycle)	Name the funding organization(s) / sources of funding for preparation, implementation and maintenance. Maintenance covers any preventative or corrective maintenance and the day-to-day running of the assets. This stage is also called operation.
Economic	Economic viability	Budget for preparation, implementation, and maintenance[3] (across the project cycle)	Specify the allocated budget for preparation, implementation and maintenance. Maintenance covers any preventative or corrective maintenance and the day-to-day running of the assets. This stage is also called operation.
Economic	Economic viability	Cost-benefit analysis (preparation)	Economic assessment that tends to be part of the appraisal documents and provides information on economic net benefits and costs (“ex ante” cost benefit analysis). A revised assessment can be prepared during the operational phase of the project to update the information on net benefits and costs (“ex post” cost benefit analysis).

[1] ISO 15686-5:2017 and RICS International Cost Management Standard (https://www.rics.org/content/dam/ricsglobal/documents/standards/icms-3-explained.pdf)

[2] Funding source in already the OC4IDS, what is now proposed is adding the breakdown per stage of the project cycle.

[3] Project budget in already the OC4IDS, what is now proposed is adding specific fields for preparation, implementation and maintenance.

Economic	Economic viability	Value for money (preparation)	Disclose the value-for-money analysis carried out for the project, along with supporting figures, calculations, and business case, based on projected or actual procurement outcomes. This tends to include considerations of economy, efficiency, effectiveness, and equity, and is part of the appraisal documents.
Economic	Economic viability	Asset lifetime (preparation)	Disclose the expected lifetime of the asset. This tends to be part of the design report.
Financial	Multiyear implementation	Budget projections (preparation)	In the case of multiyear project implementation, disclose information on budget projection for all years of implementation.
Financial	Budget execution	Budget shortfall (implementation)	Disclose any shortfall in the allocated budget, stating the reasons for it.
Economic and Financial	Economic viability	Maintenance plan (preparation)	Documentation that describes work to prevent the breakdown or malfunctioning of an asset.[4]

Source: World Bank, CoST and Open Data Services.

[4] ISO Quality Management Manual Process (https://www.9001simplified.com/pdf/Sample_Quality_Management_Manual-Process.pdf)

Table 8.2 Environmental and Climate Data Points

CoST IDS module	CoST IDS indicator	Data point (CoST IDS project stage)	Disclosure requirement
Environmental	Environmental impact	Environmental impact category (preparation)	Indicate whether an environmental impact assessment was conducted and the category that reflects the magnitude of environmental impact.[5] Consider the following to rate the project: • Category A: projects with potential significant adverse environmental or social risks and/or impacts that are diverse, irreversible, or unprecedented. • Category B: projects with potential limited adverse environmental or social risks and/or impacts that are few in number, generally site-specific, largely reversible, and readily addressed through mitigation measures. • Category C: projects with minimal or no adverse environmental or social risks and/or impacts.
Environmental	Environmental impact	Environmental measures (preparation and implementation)	Identify the measures adopted by the project to mitigate and/or remedy the environmental impact, disclosing the corresponding document that describes the project's environmental measures (if available).[6] This can include, without limitation, the following: • waste management • disposal of construction by-products • environmentally responsible sourcing of materials • environmentally responsible use of land, water and air • water contamination management • others (explain).
Environmental	Environmental impact	Environmental licenses and exemptions (preparation, implementation, and maintenance)	Disclose all licenses, exemptions and/or amnesties obtained for the project. This can be related to preparation, implementation and/or maintenance. These stages are also known as planning, construction and operation respectively.

[5] https://www.ifc.org/content/dam/ifc/doc/mgrt/sp-english-2012.pdf

[6] https://fsc.org/en, https://www.usgbc.org/leed, https://sure-standard.org/wp-content/uploads/2021/07/ST01_Normative_Standard_v2.0_clean.pdf, https://www.ifc.org/content/dam/ifc/doc/2000/2007-general-ehs-guidelines-waste-management-en.pdf, https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standards-en.pdf, https://thedocs.worldbank.org/en/doc/837721522762050108-0290022018/original/ESFFramework.pdf#page=53&zoom=80, https://sustainableinfrastructure.org/wp-content/uploads/EnvisionV3.9.7.2018.pdf

Biodiversity	Biodiversity impact	Protected area (preparation)	Identify whether the project is located in or provides access to a protected area. Use the project location/coordinates at the World Database of Protected Areas[7] to disclose the information.
Biodiversity	Biodiversity impact	Conservation measures (preparation and implementation)	Disclose and provide further details on the measures adopted by the project to protect and enhance biodiversity.[8] This can include, without limitation, the following: • avoidance of ecological siting • buffers for ecological land • nature-based solutions • land restoration • protection to landscape and historical sites • invasive species management • management of wildlife mortality risk • reduction of habitat loss • pollution reduction • land, water and air management • hazardous material management • others (explain).
Climate	Climate and disaster risk	Climate and disaster risk assessment (preparation)	Clarify the type of climate and disaster risks to which the project is exposed. This tends to be part of the appraisal documents.

[7] https://www.arcgis.com/apps/mapviewer/index.html?layers=ae78aeb913a343d69e950b53e29076f7

[8] https://sure-standard.org/wp-content/uploads/2021/07/ST01_Normative_Standard_v2.0_clean.pdf; https://www.ifc.org/content/dam/ifc/doc/2010/2012-ifc-performance-standard-6-en.pdf; https://bregroup.com/products/ceequal/the-ceequal-technical-manuals/#manual-download

Climate	Climate risk	Climate measures (preparation and operation)	Clarify whether the project design considered climate change mitigation and/or adaptation measures, disclosing the design demonstrating how the measures were incorporated.[9] This can include, without limitation, the following: • use of lower-emission sources of energy • use of lower-emission materials • use of recycled and reused materials • regenerative design • retrofitting design • use of carbon capture technology • assessment of extreme weather events • assessment of precipitation patterns • assessment of rising temperatures • assessment of rising sea levels • others (explain).
Climate	Climate risk	Forecast of greenhouse gas emissions (preparation)	Disclose the forecast greenhouse gas emissions related to the project, informing the calculation, the methodology applied, and where the calculation can be found.
Environmental and climate	Climate management	Environmental certifications (tender management)	Disclose environmental and/or climate related certifications issued for contractors and subcontractors such as ISO 14001 for environmental management.
Climate	Climate management	Decommissioning plans (decommissioning)	Disclose the decommissioning plans for the project assets.
Climate	Climate management	Decommissioning cost forecast (decommissioning)	Disclose the forecast decommissioning costs for the project assets.[10]

Source: World Bank, CoST and Open Data Services.

[9] https://sure-standard.org/wp-content/uploads/2021/07/ST01_Normative_Standard_v2.0_clean.pdf, https://sustainableinfrastructure.org/wp-content/uploads/EnvisionV3.9.7.2018.pdf

[10] RICS International Cost Management Standard (https://www.rics.org/content/dam/ricsglobal/documents/standards/icms-3-explained.pdf)

Table 8.3 Social Data Points

CoST IDS module	CoST IDS indicator	Data point (CoST IDS project stage)	Disclosure requirement
Social	Beneficiary population	Number of beneficiaries (preparation)	Indicate the number of direct and indirect project beneficiaries. Beneficiaries are the individuals who benefit directly or indirectly from the project; they are the target group of the infrastructure project and their needs are addressed by the intervention.
Social	Gender and inclusion	Inclusive design and implementation (preparation and implementation)	Clarify whether gender, people with disabilities, and vulnerable and disadvantaged populations were considered in the project design and implementation, providing details on how the design and implementation practices meet inclusion goals.
Social	Indigenous populations	Indigenous land (preparation)	Identify whether the project is located or cuts through indigenous land. Use the databases at the LandMark Global Platform of Indigenous and Community Lands[11]to disclose the information.
Social	Public participation	Public consultation meetings (preparation)	Disclose the occurrence of public meetings with communities and impacted groups including meeting invite, the number of the participants, dates and location of these meetings.
Social	Land issues	Land compensation budget[12] (preparation)	Disclose budget allocated to fund land compensation.

[11] https://www.landmarkmap.org/data/

[12] Disbursement records or payment certificates are already in the OC4IDS, what is now proposed is adding a specific sub-category for land compensation amounts.

Social	Labor compliance	Labor obligations (implementation)	Disclose labor obligations in the construction contract[13]. This can include, without limitation, the following: • minimum wage • overtime • prohibition of forced labor • prohibition of child labor • equal opportunity • non-discrimination • freedom of association • grievance mechanism • working at height • underground work • handling of materials/equipment • monitoring of accidents • traffic management • accommodation • protective equipment • others (explain).
Social	Labor compliance	Labor budget (tender management)	Disclose the amount allocated by the main contractor to cover for labor costs.
Social	Health and safety	Workers' accidents (implementation)	Disclose summary statistics on accidents and fatalities involving construction workers, and an explanation of these events.
Social	Health and safety	Health and safety certifications (tender management)	Disclose labor related certifications issued in relation to project contractors and subcontractors, such as ISO 45001 for health and safety.

[13] https://sure-standard.org/wp-content/uploads/2021/07/ST01_Normative_Standard_v2.0_clean.pdf; https://thedocs.worldbank.org/en/doc/837721522762050108-0290022018/original/ESFFramework.pdf; https://www.ifc.org/content/dam/ifc/doc/2000/2007-general-ehs-guidelines-en.pdf

Social	Health and safety	Construction materials testing (implementation)	Disclose construction materials tests performed during project implementation. This can include, without limitation, the following: • asphalt • aggregate and rock • bricks • cement • concrete • coarse and fine aggregate • masonry • metallic materials • mortar • plywood • timber • resin and polymer • soil • stone • others (explain).
Social	Health and safety	Building inspections (implementation)	Disclose building inspections during project implementation.
Social	Growth impact	Jobs generated (implementation and operation)	Disclose estimated and actual jobs (direct/indirect) during project implementation and estimated and actual jobs during operation (direct/indirect).

Source: World Bank, CoST and Open Data Services.

Table 8.4 Institutional Data Points

CoST IDS module	CoST IDS indicator	Data point (CoST IDS project stage)	Disclosure requirement
Institutional	Investment transparency	Policy coherence (identification)	Disclose documentation that evidences that the project is part of, or aligned with, existing plans and policies, providing further details on the project's policy alignment Consider alignment with the United Nations Sustainable Development Goals, national plan or strategy, infrastructure plan or strategy, sector plan or strategy, procuring entity plan or strategy, Paris Agreement goals, national adaptation plans, and medium-term fiscal frameworks.
Institutional	Access to information	Freedom-of-information requests (all stages)	Disclose freedom-of-information (FoI) requests that have been presented in relation to the project. Note that FoI requests can also be known as access to information requests.
Institutional	Access to information	Answers to freedom-of-information requests (all stages)	Disclose the responses provided by authorities to freedom-of-information (FoI) requests related to the project. Note that FoI requests can also be known as access to information requests.
Institutional	Access to information	Lobbying transparency (identification)	Disclose the occurrence of meetings with interested groups, including the number of the participants, date, location and minutes of these meetings, as well as the name and job title of the person representing the public office present at the meetings.[14]
Institutional	Access to information	Beneficial ownership (tender management)	Disclose the beneficial owners of the contractors and suppliers appointed in the project. [15]
Institutional	Award criteria	Sustainability criteria (tender management)	Identify the presence of sustainability and non-price attributes in the award criteria.[16]
Institutional	Anti-corruption impact	Anti-corruption certifications (tender management)	Disclose anti-corruption certifications of the project, such as ISO 37001 on Anti-Bribery Management Systems Standard.

[14] https://lobbyingtransparency.net/standards/regulatory-scope/; access-info.org/wp-content/uploads/Lobbying_Transparency_Via_RTI_Laws_EN.pdf

[15] https://extensions.open-contracting.org/en/extensions/beneficialOwners/master/g); https://standard.openownership.org/en/0.3.0/index.html

[16] https://extensions.open-contracting.org/en/extensions/sustainability/master/

Institutional	Anti-corruption impact	Independent monitoring[17] (implementation)	Identify the entities acting as independent monitors of the project.[18]
Institutional	Key performance indicators	Performance monitoring (implementation)	Disclose key performance indicators adopted by the project.
Institutional	Risk management	Risk management plans (preparation)	Disclose risk management plans prepared for the project.

Institutional	Subsectors[19]	Sustainable subsectors (identification)	Identify relevant subsectors related to the project scope. Select from a list (non-exhaustive):
			• Renewable energy
			  ○ Solar
			  ○ Wind
			  ○ Hydropower
			  ○ Biomass
			  ○ Geothermal
			• Water and wastewater management
			• Transport
			  ○ Low-carbon transport
			• Natural resource management
			  ○ Flood protection

Source: World Bank, CoST and Open Data Services.

[17] Organization names are already in the CoST IDS and OC4IDS, what is now proposed is adding specific sub-category for independent monitoring entities.

[18] https://giaccentre.org/pacs_ps11/

[19] Sectors are already included in the CoST IDS and OC4IDS, what is now proposed is adding subsectors related to sustainable infrastructure.

Table 8.5 shows how the sustainable infrastructure data points are distributed across project identification, preparation, tender management, implementation, completion, operation and maintenance, and decommissioning.

Table 8.5 Sustainable Infrastructure Data Points by Project Stage

Project stage	Sustainable infrastructure data points			
	Economic and finance	Environmental and climate	Social	Institutional
Project identification				• Policy coherence • Freedom-of information requests and answers • Lobbying transparency • Sustainable subsectors
Project preparation	• Procurement strategy • Life-cycle cost • Life-cycle cost calculation methodology • Funding source for preparation • Budget for preparation • Cost-benefit analysis • Value for money • Asset lifetime • Budget projections • Maintenance plan	• Environmental impact category • Environmental measures • Environmental licenses and exemptions • Protected area • Conservation measures • Climate and disaster risk assessment • Climate measures • Forecast of Green House Gas Emissions	• Number of beneficiaries • Inclusive design • Indigenous land • Public consultation meetings • Land compensation budget • Labor obligations	• Freedom-of information requests and answers • Risk management plans
Tender management		• Environmental certifications	• Labor budget • Health and safety certifications	• Freedom-of information-requests and answers • Beneficial ownership • Sustainability criteria • Anti-corruption certifications
Contract implementation	• Budget shortfall • Funding source for implementation • Budget for implementation	• Environmental measures • Environmental licenses and exemptions • Conservation measures • Climate measures	• Inclusive implementation • Workers' accidents • Construction materials testing • Building inspections • Jobs generated	• Freedom-of-information requests and answers • Independent monitoring • Performance monitoring
Project completion				• Freedom-of-information requests and answers
Maintenance and operation	• Funding source for maintenance • Budget for maintenance	• Environmental licenses and exemptions	• Jobs generated	• Freedom-of-information requests and answers
Decommissioning		• Decommission plan • Decommission cost forecast		• Freedom-of-information requests and answers

Source: World Bank, CoST and Open Data Services.
Note: Operation and maintenance and Decommissioning are not in the current CoST IDS and OC4IDS.

8.2 Practical Use Cases

Practical use cases are high-level narrative descriptions of how different stakeholders want to use and/or share data. Combined with user stories, which are detailed descriptions of concrete needs, these narratives provide illustrations of how the proposed sustainable infrastructure data points can be applied in practice.

Eleven use cases were developed based on the proposed data points. They have been separated into sustainability use cases and general use cases based on how they interact with the scope of this work: social, economic, environmental and climate, and institutional sustainability.

Many of the use cases are interlinked and dependent upon each other, reflecting that sustainability is a concept that needs to be considered at every stage in an infrastructure project, from planning to maintenance and decommissioning. Some use cases emerged around how the data is shared, and these are specified as "platform use cases".

Examples are provided in Box 8.2.1. The full set of use cases and user stories are presented in Appendix F.

Box 8.2.1 Example Use Cases

Carbon Footprint

- Procurement officers need to understand the carbon balance of the whole project including materials and ongoing maintenance as part of judging individual bids.
- Civil society needs the same information to monitor the project.
- Procuring entities need this information to include in local and national zero carbon plans and to ensure they are complying with published carbon commitments.

Stakeholders can be supported by data points to inform:
- that the carbon footprint of the project has been calculated
- which methodology (standard, tool, or calculator) has been used
- where the carbon calculations can be found.

Deforestation risks and conservation measures

- Destruction of forests and grasslands is one of the biggest causes of biodiversity loss. Procurement officers need to assess the risks that infrastructure projects can cause to the environment, making sure that conservation measures provided in appraisal are sufficient to effectively enhance biodiversity and protect grasslands and areas of forest.
- Citizens and civil society need information on environmental risks and conservation measures to monitor biodiversity loss and hold decision-makers and contractors to account. As a specific infrastructure risk, deforestation needs special attention depending on the location and type of infrastructure project.

Stakeholders can be supported by data points to inform:

- what risks have been declared by procuring entities during project appraisal
- the project location and proximity to protected areas
- which conservation measures have been provided and budgeted for

Source: World Bank, CoST, and Open Data Services.

8.3 Data Model

A model of how the data points will be structured in OC4IDS can be found at https://standard.open-contracting.org/staging/infrastructure/oc4ids-review-docs/en/cost/ids/sustainability/.

9. Conclusions

Sustainability is a multi-dimensional concept that has been explained and categorized in many ways. Simply put, it is the ability of people and places to prosper without harming one another. For infrastructure, sustainability requires that assets and systems are of sufficient resilience and quality to provide reliable services to communities they are meant to serve, but without impacting other communities and locations. As the climate emergency escalates, sustainability of assets and the financial means to tackle mitigation and adaptation have never been more pronounced.

The findings of this analysis reiterate the importance of generating reliable data to support the procurement of sustainable infrastructure. Despite challenges in terms of data supply and quantification, data points have been developed that capture sustainability for the sector. The proposed data points can help strengthen accountability and planning practices towards more sustainable projects, as follows:

- Economic and financial sustainability data points cover short- and long-term budget implications of projects, as well as the operation and maintenance stage of the project cycle.
- Environmental and climate sustainability data points include biodiversity, disaster, and climate related risks.
- Social sustainability data points cover a range of project impacts, from gender equality, inclusion, and participation to health and safety matters.
- Institutional sustainability data points consider means to assess project coherence with existing policies, as well as integrity risks in decision-making, access-to-information mechanisms, and monitoring practices of projects.

Table 9.1 summarizes the proposed data points. These will work as optional modules of the CoST Infrastructure Data Standard (CoST IDS) and associated Open Contracting for Infrastructure Data Standards Toolkit (OC4IDS), and they can be adopted by countries and procuring entities for a deeper understanding of sustainability of their infrastructure investment.

In terms of next steps, the new data points, their thematic modules, and the data modeling will be applied by CoST members and other interested partners with a view of scaling up their adoption worldwide.

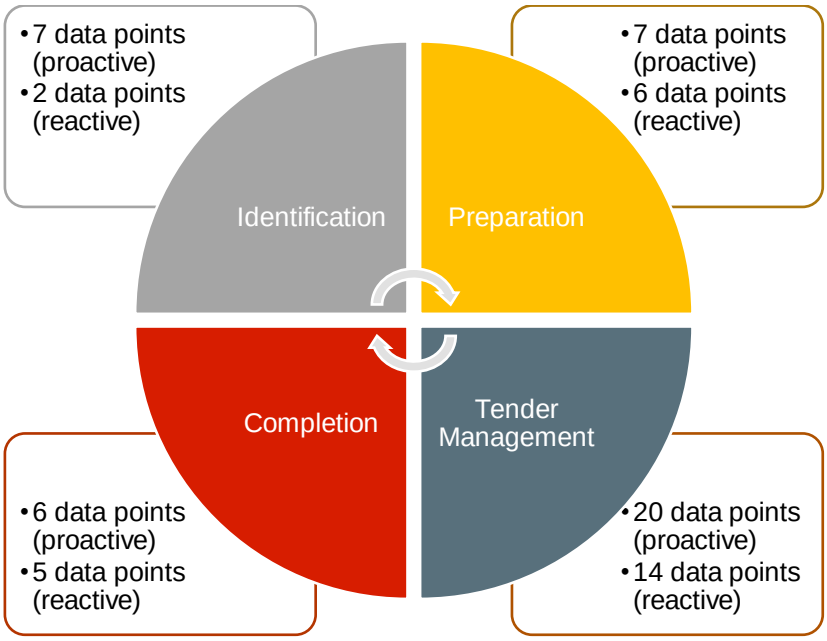
Table 9.1 Sustainable Infrastructure Data Points Grouped by Theme

Economic and Financial Data Points	**Environmental and Climate Resilience Data Points**
• Procurement strategy • Life-cycle cost • Life-cycle cost calculation methodology • Funding source for preparation, implementation and maintenance • Budget for preparation, implementation and maintenance • Cost-benefit analysis • Value for money • Asset lifetime • Budget projections • Budget shortfall • Maintenance plan	• Environmental impact category • Environmental measures • Environmental licenses and exemptions • Protected area • Conservation measures • Climate and disaster risk • Climate measures • Forecast of greenhouse gas emissions • Environmental certifications • Decommissioning plans • Decommissioning costs
Social Data Points	**Institutional Data Points**
• Number of beneficiaries • Inclusive design and implementation • Indigenous land • Public consultation meetings • Land compensation budget • Labor obligations • Labor budget • Workers' accidents • Health and safety certifications • Materials testing • Building inspections • Jobs generated	• Policy coherence • Freedom-of-information requests and answers • Lobbying transparency • Beneficial ownership • Sustainability criteria • Anti-corruption certifications • Independent monitoring • Performance monitoring • Risk management plans • Sustainable subsectors •

Source: World Bank, CoST, and Open Data Services.

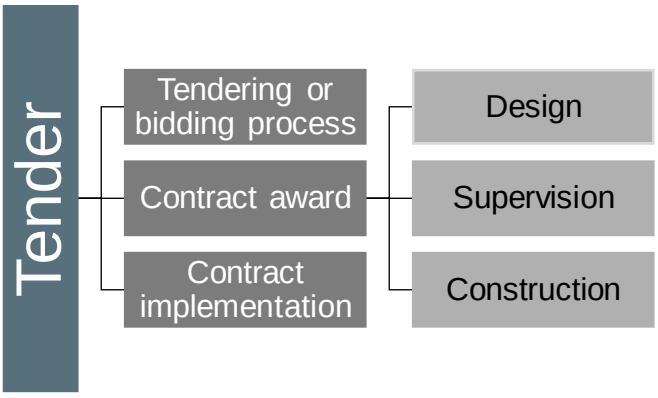
Appendix A: CoST IDS and OC4IDS

Figure A.1 CoST Infrastructure Data Standard (CoST IDS) Project Cycle



Source: CoST.

Figure A.2 CoST IDS Contract Cycle



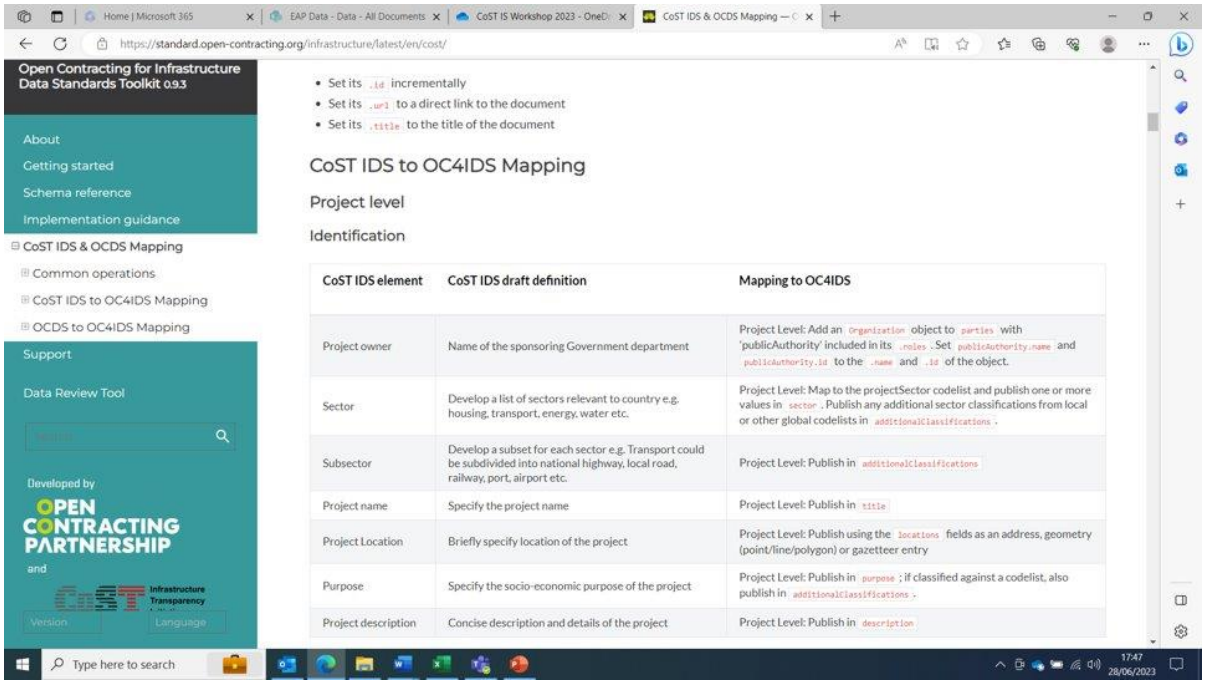
Source: CoST.

Table A.1 Current CoST IDS Data Points

Project stage	Project identification	Project preparation	Tender management	Contract implementation	Project completion
Proactive disclosure	• Project reference number • Project owner • Sector, subsector • Project name • Project location • Purpose • Project description	• Project scope (main output) • Environmental and social impact • Land and resettlement impact • Contact details • Funding sources • Project budget • Project budget approval date	• Procuring entity • Procuring entity contact details • Procurement process • Number of firms tendering • Cost estimate • Contract type • Contract administration entity • Contract title • Contract firm(s) • Contract price • Contract scope of work • Contract start date • Contract duration • Contract status (current)	• Variation to contract price • Escalation of contract price • Variation to contract duration • Variation to contract scope • Reasons for price changes • Reasons for scope and duration changes	• Project status (current) • Completion cost (projected) • Completion date (projected) • Scope at completion (projected) • Reasons for project changes • Reference to audit and evaluation reports
Reactive disclosure	• Project officials and roles • Project brief or feasibility study	• Environmental and social impact assessment • Resettlement and compensation plan • Financial agreement • Multiyear programme and budget • Procurement plan • Project approval decision	• Contract officials and roles • Procurement method • Tender documents • Tender evaluation results • Project design report • Contract agreement and conditions • Registration and ownership of firms • Specifications and drawings	• Implementation progress reports • Budget amendment decision • Project completion report • Project evaluation report • Technical audit reports • Financial audit reports	• List of variations, changes, amendments • List of escalation approvals • Quality assurance reports • Disbursement records or payment certificates • Contract amendments

Source: CoST.

Figure A.3 Example of How CoST IDS Data Points Are Mapped to the Open Data for Infrastructure Data Standards Toolkit (OC4IDS)



Source: Open Contracting Partnership and CoST.[1]

[1] https://standard.open-contracting.org/infrastructure/latest/en/cost/

Appendix B: Sustainability Domain Review Findings

Table B.1 Economic and Financial Dimension

Project cycle	Key performance indicators	Potential metrics
Decision-making	• Operating profitability • Procurement viability • Employment opportunities	a) Project life-cycle cost analysis b) Estimated annual operational cost c) Payback period d) Internal rate of return e) Procurement strategy analysis f) Employment opportunities in construction and operation
Planning	• Risk mitigation • Budget transparency • Workforce investment • Community investment	a) Debt sustainability assessment b) Risk register c) Funding sources d) Budget allocation breakdown (implementation, operation and maintenance) e) Continuity and contingency plans f) Workforce development plan g) Complementary interventions
Tender	• Creditworthiness • Service provision guarantee	a) Bidders' solvency statements b) Minimum revenue guarantee provision c) Bid with a fair margin
Implementation	• Budget management	a) Budget management plan b) Project financial tracker c) Budget amendment decision d) Auditing assessments e) Delays management plan
Operation	• Cash management	a) Operational cash management plan b) Asset revenue streams c) Actual annual operational cost d) Maintenance plan e) Project included on fiscal frameworks
Decommission/ end-of-life	• Projected lifetime	a) Expected lifetime of the asset

Source: World Bank, CoST, and Open Data Services.

Table B.2 Environmental and Climate Dimension

Project cycle	Key performance indicators	Potential metrics
Decision-making	• Ecology impact	a) Ecological siting impact b) Risk of deforestation c) Level of farmland disturbance d) Level of biodiversity impact e) Provision of ecological land buffers f) Operation in climate sensitive region
Planning	• Environmental risk assessment	a) Environmental impact assessment b) Environmental impact category c) A plan to carry the results of the environmental impact assessment through to tender and the detailed design d) Environmental license or permit e) Transition to net zero f) Climate change mitigation and adaptation measures incorporated into the project design g) Maladaptation risk assessment h) Climate hazard and vulnerability assessment i) Climate related opportunities j) Utilization of nature-based solutions for resilience l) Land restoration plan m) Assessment of project's greenhouse gas emissions
Tender	• Green tender conditions	a) Low-emission condition or specification in the tender rules b) Low-waste condition or specification in the tender rules c) Weight of environmental and climate evaluation criteria on the award decision
Implementation	• Green construction	a) Waste management plan / policy b) Recycling and reuse plan / policy c) Soil management plan / policy d) Water management plan / policy e) Groundwater management plan / policy f) Sustainable material sourcing plan / policy g) Sustainable energy use plan / policy h) Noise management plan / policy i) Air pollution and greenhouse gas emission reduction plan / policy j) Project certification ISO 14001 for environmental management
Operation	• Green operation and resilience	a) Level of carbon operation dependency b) Greenhouse gas avoided over the lifetime of the asset c) Disaster mitigation plan / policy d) Infrastructure interdependency analysis
Decommission/ end-of-life	• Recycle or reuse of materials	a) Plan to reuse materials in other projects

Source: World Bank, CoST, and Open Data Services.

Table B.3 Social Dimension

Project cycle	Key performance indicators	Potential metrics
Decision-making	• Participation and engagement processes during appraisal • Project beneficiaries	a) Consultation process with vulnerable, marginalized, and disadvantaged groups b) Percentage of the beneficiary population living under $5/day c) Beneficiary population socioeconomic and gender segmentation
Planning	• Social needs assessment • Social impact assessment • Gender responsive and inclusive design	a) Social needs assessment b) Social impact assessment c) A plan to carry the results of the social impact assessment through to tender and the detailed design d) Land compensation disputes e) Gender responsive and inclusive design
Tender	• Participation of small or medium enterprise • Participation of women and disadvantaged groups • Promotion of local content • Promotion of labor and human rights standards	a) Share of small or medium enterprise bidders in tender b) Share of woman-owned enterprise bidders in tender c) Share of disadvantaged-group-owned enterprise bidders in tender d) Share of local and national enterprise bidders in tender e) Share of bids by businesses owned by local or indigenous enterprise f) Local supplier condition or specification in the tender rules g) Local workforce condition or specification in the tender rules h) Tender provision mandating the bidding companies to commit to internationally recognized labor standards i) Tender provision mandating the bidding companies to report on human rights performance j) Weight of social evaluation criteria on the award decision

Implementation	• Freedom of association • Access to effective remedy • Health and safety of the working environment	a) Percentage of the workforce that is part of a trade union or a workers' association b) Percentage of the workforce composed of migrant workers c) Percentage of the workforce composed of female workers d) Percentage of the workforce composed of local or indigenous workers e) Grievance mechanism available to workers f) Number of grievances submitted during project execution g) Number of grievances settled during project execution h) Tiers of subcontractors working on the project i) Human rights risk assessment and due diligence conducted by the main contractor j) Channel to report human and labor rights issues occurred throughout the supply chain (for example ombudsman, a whistleblowing system, and project hotline) k) Project certification ISO 45001 for health and safety l) Compliance with safety and building code regulations
Implementation	• Participation and engagement processes during project delivery	a) Number of freedom-of-information requests presented in relation to the project b) Number of responses to freedom-of-information requests c) Number of complaints submitted during project execution d) Number of complaints responded to during project execution e) Community and social audits f) Construction and building code amnesties
Operation	• Quality of provision	a) Community satisfaction surveys

Source: World Bank, CoST, and Open Data Services.

Table B.4 Institutional Dimension

Project cycle	Key performance indicators	Potential metrics
Decision-making	•Investment allocation process	a) Contribution to the United Nations Sustainable Development Goals b) Nationally determined contributions and national adaptation plan alignment c) Project linked to the country long-term vision and a public investment plan, policy, or government portfolio d) Lobbying regulation
Planning	• Appraisal process	a) Alternative analysis b) Cost-benefit analysis c) External appraisal review d) Needs assessment e) Evidence of compliance with building regulations
Tender Implementation	• Roles and responsibilities • Monitoring structures	a) Officials involved in budget approval and oversight b) Quality management plans f) Anti-corruption policy g) Anti-slavery policy h) Safeguarding, anti-discrimination, and sexual abuse prevention policy i) Project whistle-blower policy j) Results of significant disputes between project stakeholders
Operation	• Performance information • Quality of provision	a) Key performance indicators adopted by the project b) Performance failures (number of events, category, and year) c) Performance assessments d) Penalties and compensations due to quality issues e) Quantifiable benefits of the project (for example, reduced travel time, reduced travel cost, percentage increase access to electricity, and percentage increase access to water) f) Systems in place to capture project data and to make effective use of it to improve decision-making
Decommission/ end-of-life	• Projected lifetime	a) Asset decommission plan

Source: World Bank, CoST, and Open Data Services.

Appendix C: Stakeholder Survey Questions

Table C.1: Stakeholder Survey Questionnaire

STAKEHOLDER GROUP AND DATA USE
Please indicate the following data: Your country of residence
The role that most accurately describes your stakeholder group in relation to infrastructure investment • Government (including Public Sector institutions and State-Owned Enterprises) • Private Sector • Civil Society • Academia • International Financial Institutions • Media • Other (please specify)
How do you use publicly available data and information from infrastructure investments (you can select multiple answers) • To have oversight of infrastructure investments and related risks within a sector, region, or country • To better understand the infrastructure market for potential investment and commercial opportunities • To specifically monitor integrity risks of infrastructure investments • To monitor the impact of an infrastructure project on the environment and local community • To investigate and publish an article about an infrastructure project where concerns have been raised • To identify infrastructure investments for further monitoring and investigation • To carry out research into the sector • I don't currently use publicly available data or information from infrastructure investments • Other (please specify)
STRATEGIC INFRASTRUCTURE PLANNING
Please indicate how important is for you to have access to published information that the infrastructure project aligns with: 1. A long-term vision for sustainable development (from 1 to 5) 2. The country national development plan or strategy (from 1 to 5) 3. The infrastructure plan or strategy (from 1 to 5) 4. International commitments for sustainable development, including climate related commitments (from 1 to 5) **5.** National or subnational sectoral plan or strategy (from 1 to 5)
STRATEGIC PROJECT PLANNING
Please indicate how important it is for you to have access to published information on: 1. Current and future demand for services based on population and country needs (from 1 to 5) 2. Synergies or interactions between infrastructure systems (from 1 to 5) 3. Balancing trade-offs between new and existing infrastructure (from 1 to 5) 4. Cumulative impacts on the environment, climate, and communities, and the mitigation of those impacts (from 1 to 5) **5.** Potential risks to the viability of the infrastructure project, including climate related hazards and natural disasters (from 1 to 5)
PROJECT PREPARATION
Please indicate how important it is for you to have access to published information on: 1. Cost-benefit analysis (from 1 to 5)

2. Risk management plan (from 1 to 5)
3. Justification for selecting the design and the choice of technology for the project (from 1 to 5)
4. Justification for the project location (from 1 to 5)
5. Plans for the operation and maintenance and decommissioning of the asset (from 1 to 5)

ENVIRONMENTAL ISSUES

Please indicate how important it is for you to have access to published information on:

1. How the project protects and enhances biodiversity, including by using nature based solutions (from 1 to 5)
2. Measures to mitigate and remedy environmental impact (from 1 to 5)
3. Measures to enhance climate resilience through adaptation of the infrastructure (from 1 to 5)
4. Disaster and emergency plans during all stages of the infrastructure life cycle (from 1 to 5)
5. Weighting of environmental evaluation criteria in the tender award decision (from 1 to 5)

USE OF RESOURCES

Please indicate how important it is for you to have access to published information on:

1. The financial resources used during construction and operation and maintenance (from 1 to 5)
2. The amount of greenhouse gas emissions during project construction and operation (from 1 to 5)
3. Project plans to monitor pollution and waste generation and management during construction and operation (from 1 to 5)
4. Project plans to reuse and recycle materials (from 1 to 5)
5. How the tender process considered life-cycle costing, rated criteria, and sustainability factors when awarding contracts (from 1 to 5)

INCLUSIVINESS AND EQUITY

Please indicate how important it is for you to have access to published information on:

1. How the project is responsive to the needs of vulnerable, marginalized, and disadvantaged groups (from 1 to 5)
2. Specific measures adopted under the project to ensure equality of employment opportunity and equality to provide goods, services, or works (from 1 to 5)
3. Specific measures adopted under the project to ensure inclusion of vulnerable, marginalized, and disadvantaged groups during all stages of the infrastructure life cycle (from 1 to 5)
4. Measures taken to ensure human rights and construction workers' rights are protected throughout the supply chain (from 1 to 5)
5. Processes for achieving displacement minimization and acceptable associated resettlement (from 1 to 5)

ECONOMIC BENEFITS

Please indicate how important it is for you to have access to published information on:

1. Planned short-term and long-term economic benefits of the project (direct and indirect economic benefits) (from 1 to 5)
2. Achieved short-term and long-term economic benefits of the project (direct and indirect economic benefits) (from 1 to 5)
3. Employment generation associated with the project, including job opportunities and skills development for local communities (from 1 to 5)
4. Share of contracts awarded to women-owned and local enterprises (from 1 to 5)
5. Share of contracts awarded to small and medium enterprises (from 1 to 5)

SOCIAL IMPACTS

Please indicate how important it is for you to have access to published information on:

1. The population benefitting from the project (from 1 to 5)
2. Weighting of social evaluation criteria on the award decision (from 1 to 5)
3. Data on accidents and fatalities of construction workers (from 1 to 5)
4. Provision of complementary interventions to benefit local activities and communities (from 1 to 5)
5. Compliance with safety regulations and building codes (from 1 to 5)

FISCAL SUSTAINABILITY

Please indicate how important it is for you to have access to published information on:

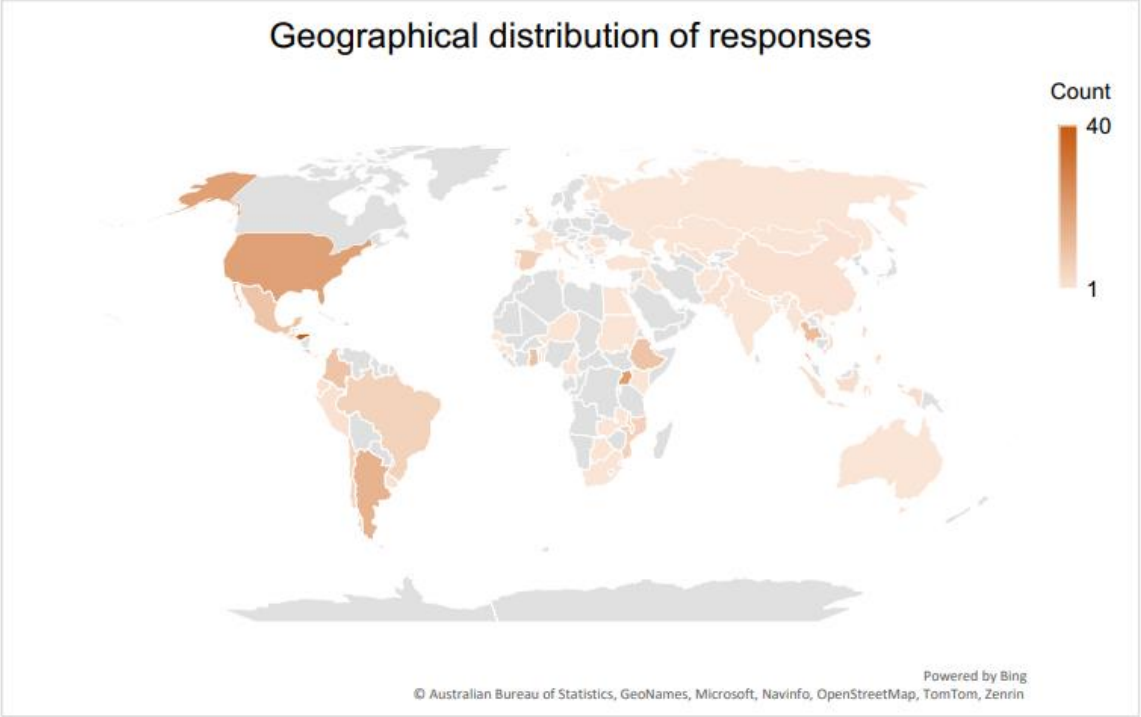
1. Debt sustainability assessments (from 1 to 5)
2. Project funding and financing sources (from 1 to 5)
3. Value-for-money assessment (from 1 to 5)

4. Report on the state of public finances for the project (from 1 to 5) 5. Project operational revenue streams, such as from tariffs (from 1 to 5) **6.** Beneficial ownership (from 1 to 5)
PARTICIPATORY DECISION-MAKING
Please indicate how important it is for you to have access to published information on: 1. Early consultation with impacted groups (from 1 to 5) 2. Lobbying activities (from 1 to 5) 3. Stakeholders' grievance mechanisms, including community and workers' complaints (from 1 to 5) 4. Access-to-information mechanisms (from 1 to 5) **5.** Public participation throughout the project life cycle (from 1 to 5)
EVIDENCE BASED DECISION-MAKING
Please indicate how important it is for you to have access to published information on: 1. Key performance indicators adopted by the project (from 1 to 5) 2. Assessments on the project's operational performance (from 1 to 5) 3. Assessments on the project impacts (from 1 to 5) 4. The results of due process being followed in the resolution (or not) of significant disputes between project stakeholders (from 1 to 5) 5. Systems in place to capture project data and to make effective use of it to improve decision-making (from 1 to 5)
CLIMATE FINANCE INFRASTRUCTURE
Please indicate how important it is for you to have access to published information on: 1. Climate change mitigation measures that have been incorporated into the project design (from 1 to 5) 2. Climate change adaptation measures that have been incorporated into the project design (from 1 to 5) 3. Project exposure to climate related risks, such as cyclones, floods, rising sea levels, or temperature levels (from 1 to 5) 4. Project alignment towards climate related opportunities, such as resources efficiencies, energy sources, new products, resilience, and new markets (from 1 to 5) **5.** Plans on whether and how the project seeks to contribute to a transition to net zero (from 1 to 5)

Source: World Bank, CoST, and Open Data Services.

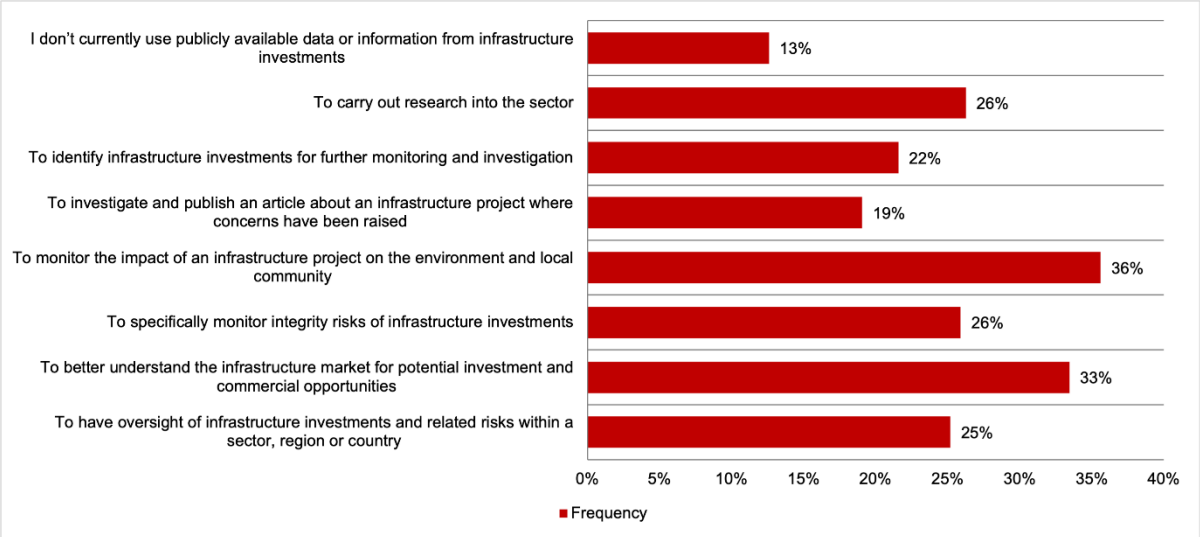
Appendix D: Stakeholder Survey Findings

Figure D.1 Geographical Distribution of Survey Respondents



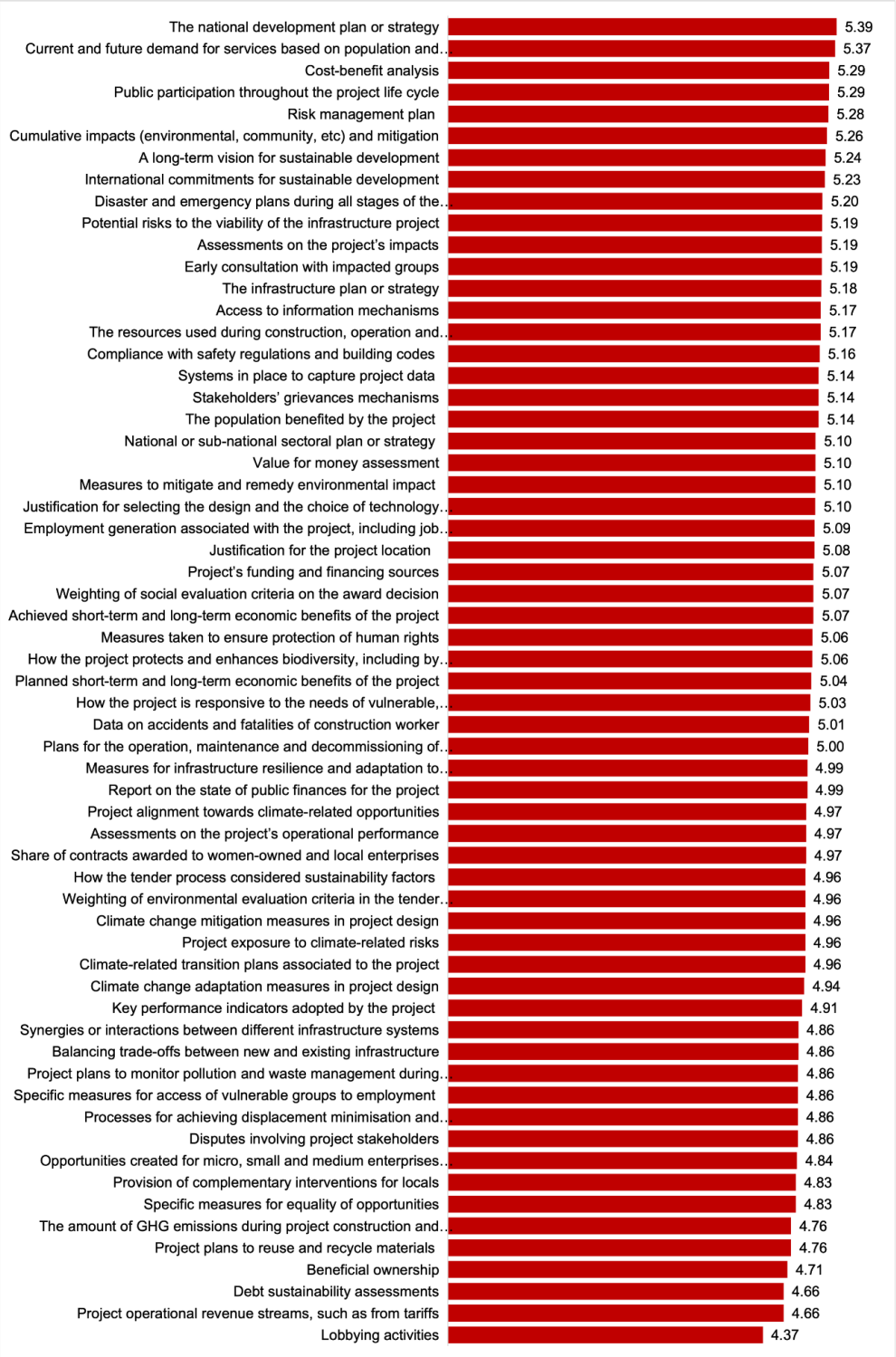
Source: World Bank, CoST, and Open Data Services.

Figure D.2 Infrastructure Data Use by Respondents



Source: World Bank, CoST, and Open Data Services.

Figure D.3 Government Ranking of Sustainability Indicators

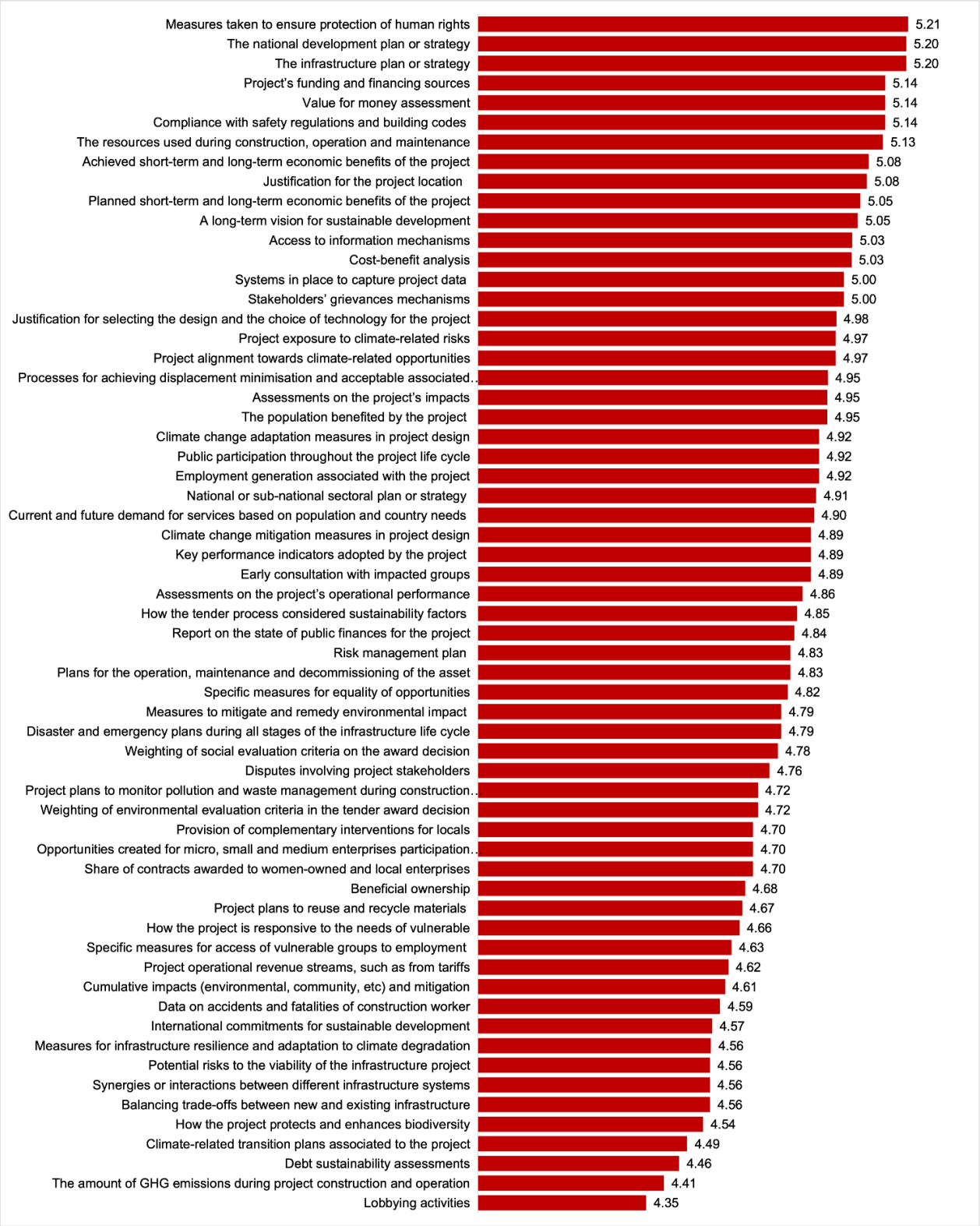


Source: World Bank, CoST, and Open Data Services.

Figure D.4 Civil Society Ranking of Sustainability Indicators

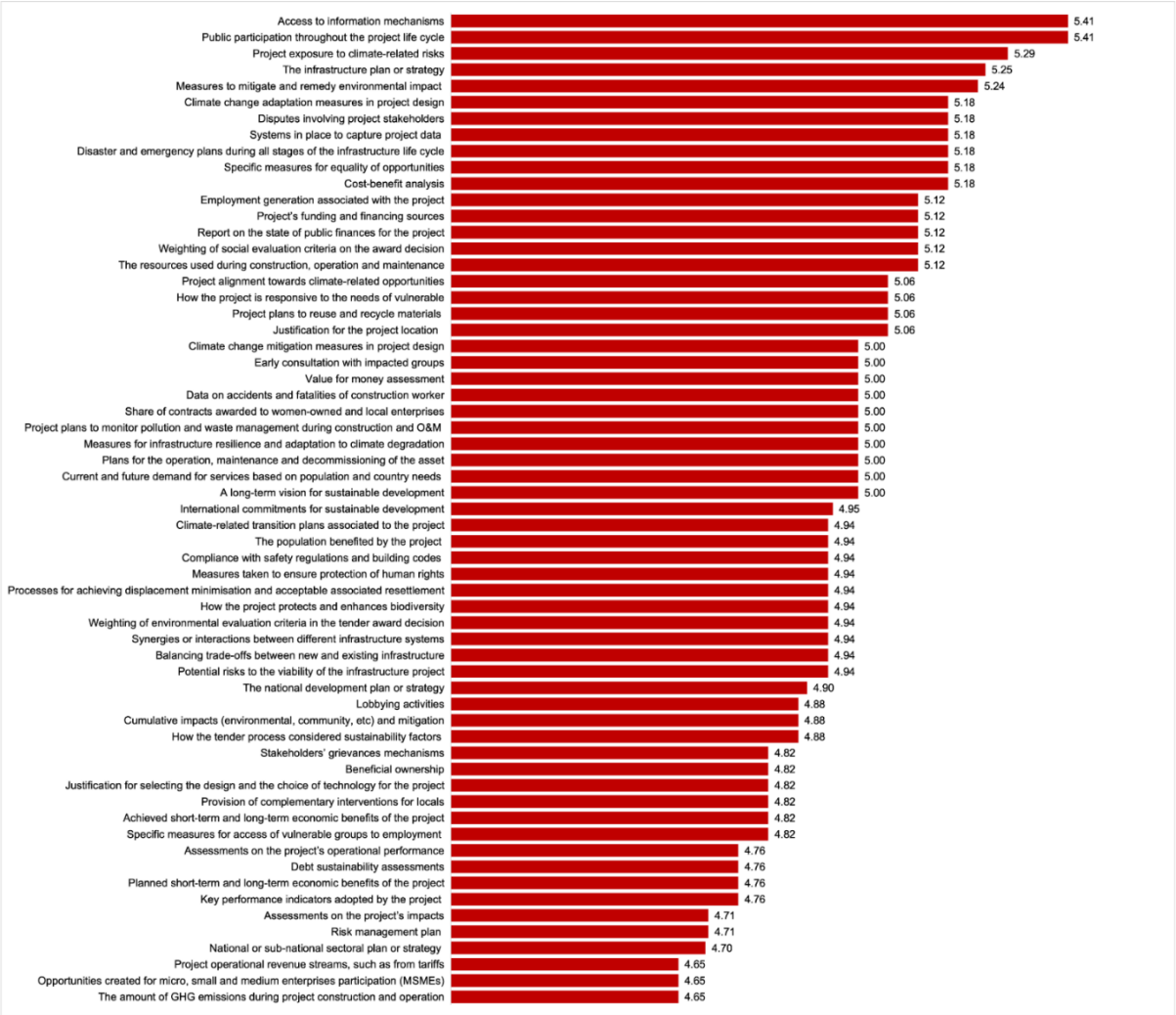
Source: World Bank, CoST, and Open Data Services.

Figure D.5 Private Sector Ranking of Sustainability Indicators



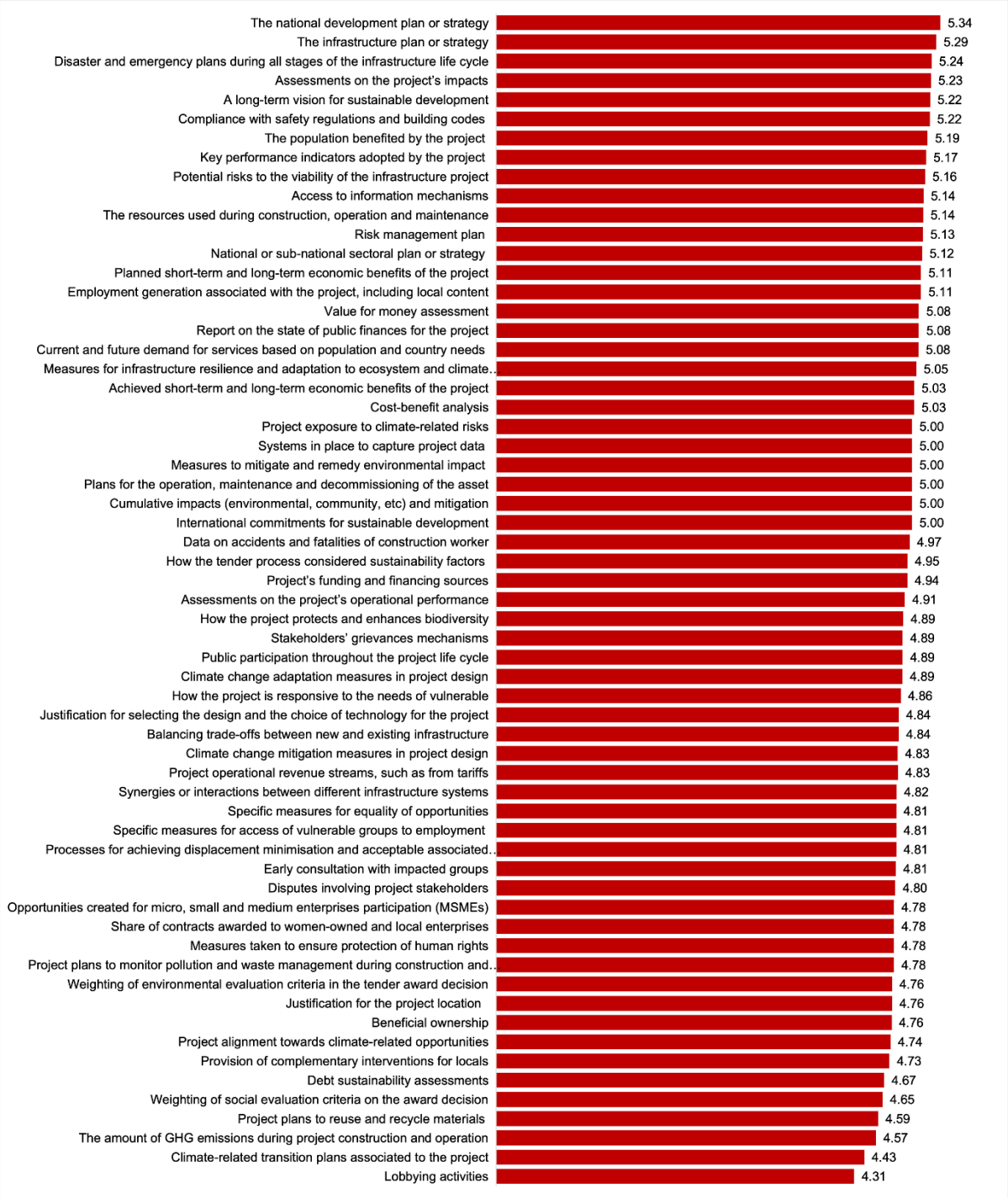
Source: World Bank, CoST, and Open Data Services.

Figure D.6 Media Ranking of Sustainability Indicators



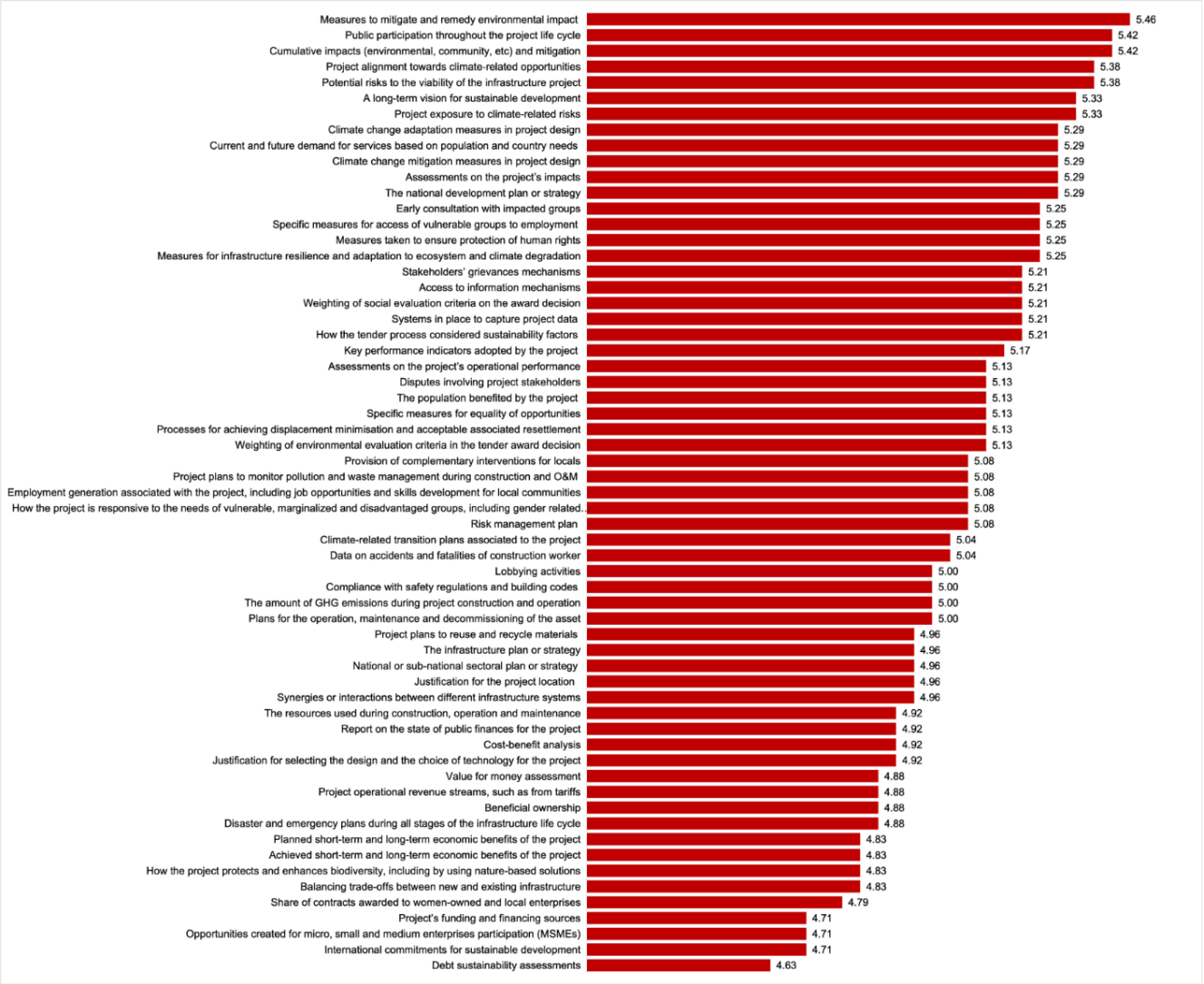
Source: World Bank, CoST, and Open Data Services.

Figure D.7 International Financial Institutions Ranking of Sustainability Indicators



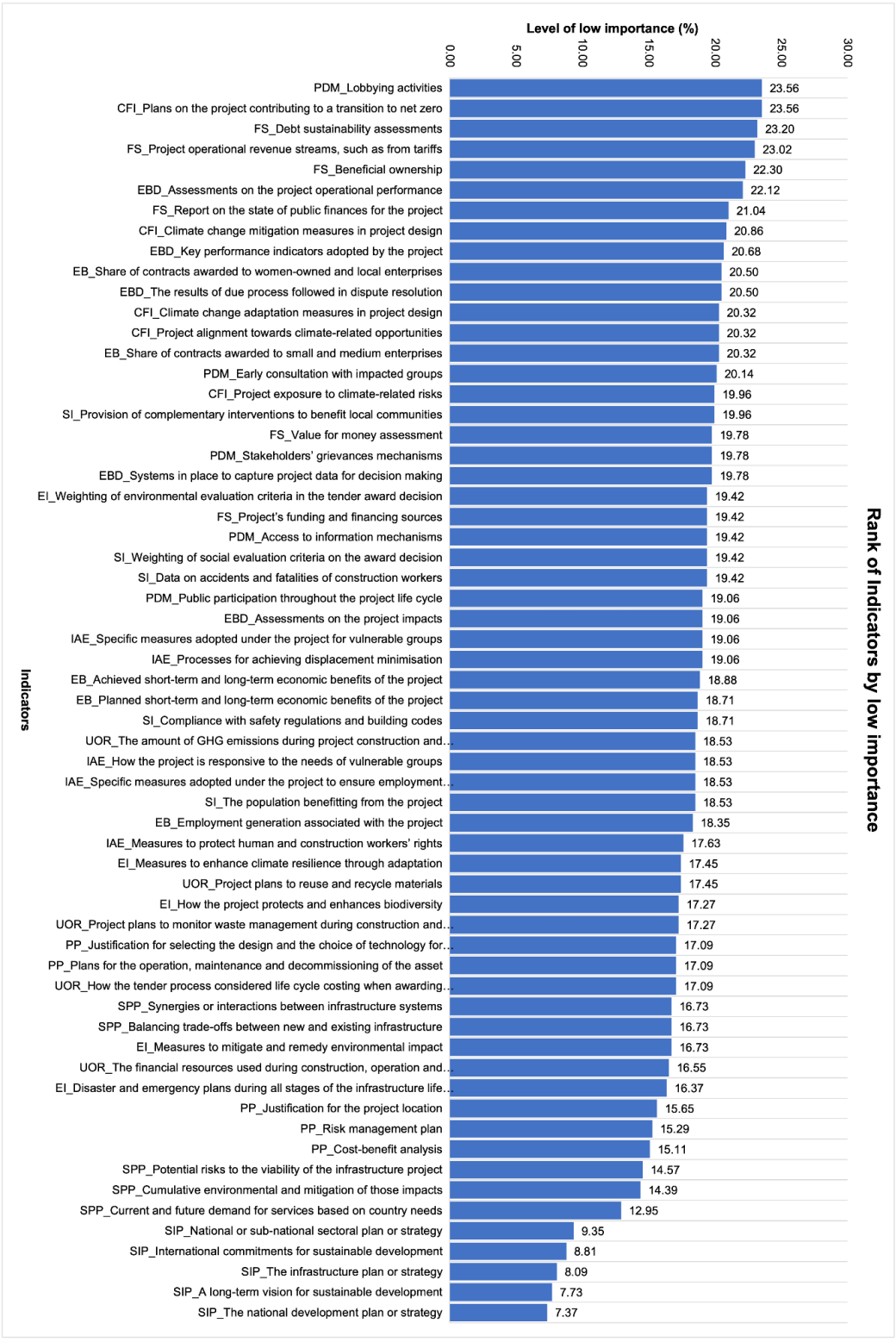
Source: World Bank, CoST, and Open Data Services.

Figure D.8 Academia Ranking of Sustainability Indicators



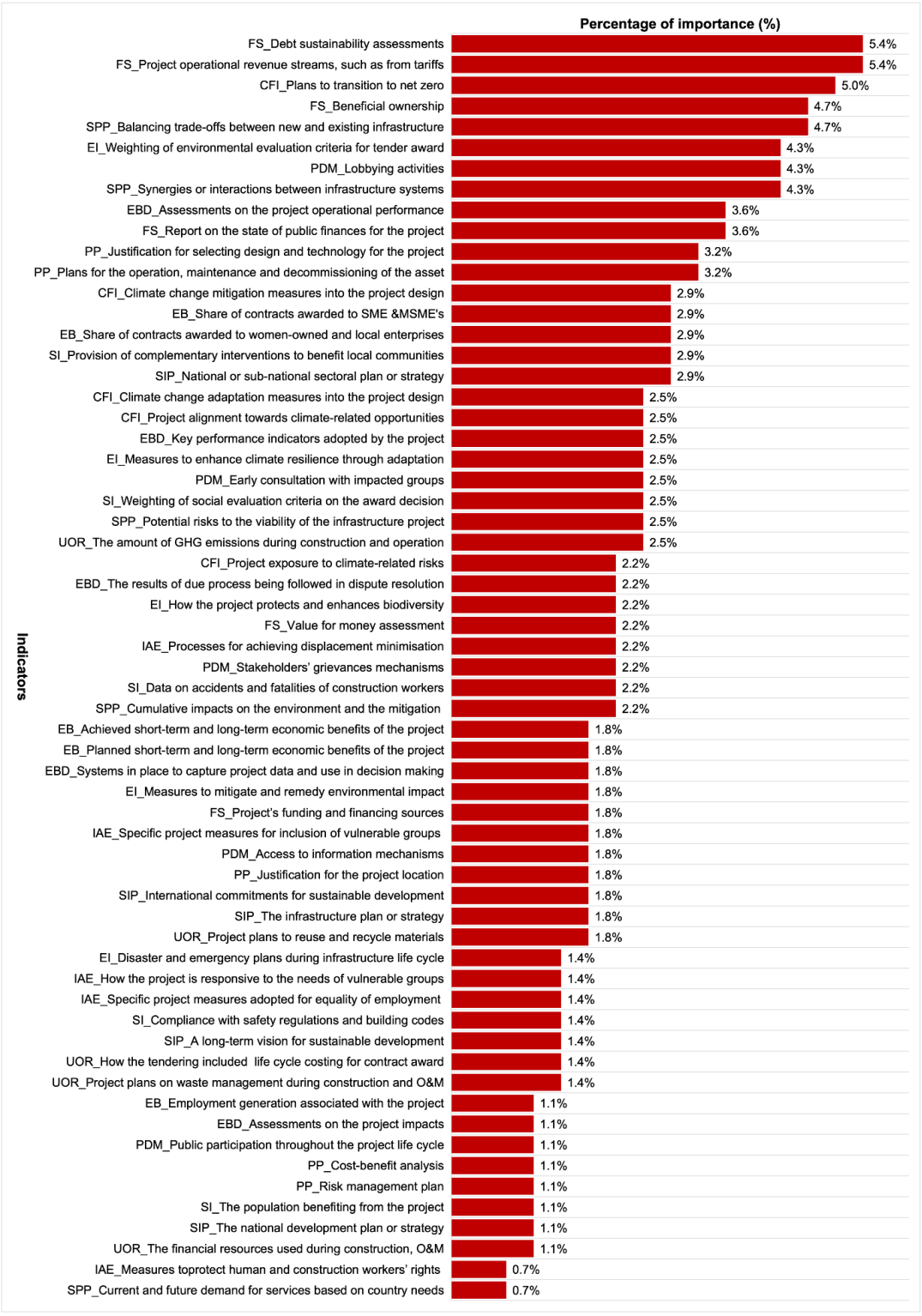
Source: World Bank, CoST, and Open Data Services.

Figure D.9 Ranking of Sustainability Indicators with “Not Important” Responses



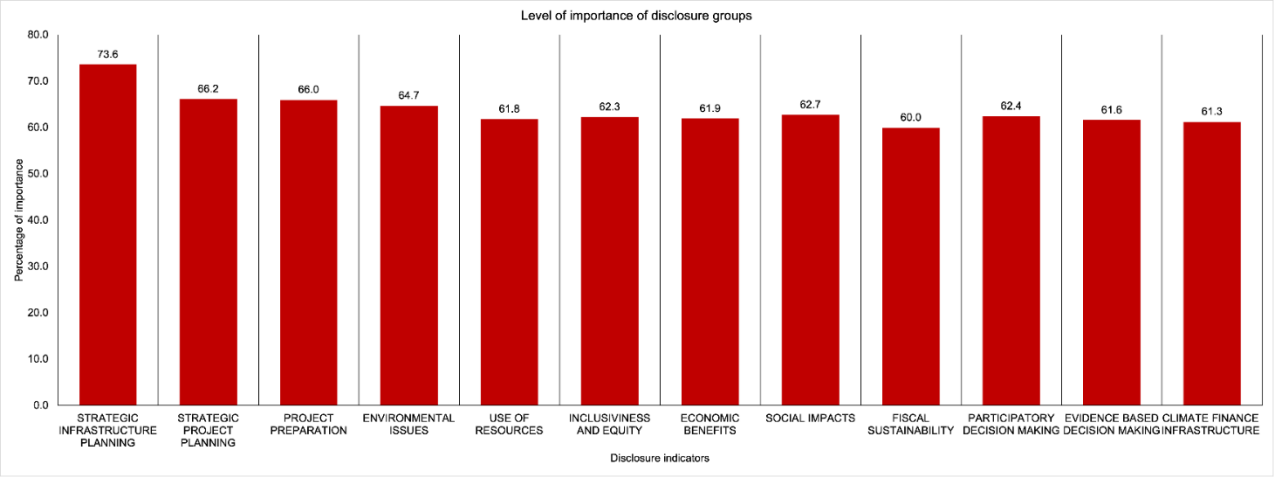
Source: World Bank, CoST, and Open Data Services.

Figure D.10 Ranking of Sustainability Indicators with "I Don't Know" Responses



Source: World Bank, CoST, and Open Data Services.

Figure D.11 Overall Ranking of Sustainability Indicators by Disclosure Area



Source: World Bank, CoST, and Open Data Services.

Appendix E: Supply Side Review Findings

The supply side research identified the following common fields and data structures for sustainable infrastructure.

E.1. United Nations Sustainable Development Goals, Targets and Indicators

Within the supranational agencies and in some individual countries, the United Nations (UN) Sustainable Development Goal (SDG) indicators[1] were commonly found. These indicators are used to report on a country's progress towards the 17 SDG[2] at a country, and in some cases sub-country regional level, with each SDG being broken down into a set of indicators. These indicators provide country level values (for example, "Percentage of population with XX", "Proportion of transboundary basin area with an operational arrangement for water cooperation", and "Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities") on an annual basis.

The Organisation for Economic Co-operation and Development (OECD) also publishes global indicators covering some similar information, but with a more explicitly economic focus.[3] In both cases they are not at a level that can be directly tied to specific infrastructure projects.

In the forthcoming Open Contracting for Infrastructure Data Standards Toolkit (OC4IDS) 0.9.4 release, projects can be classified according to the SDGs and SDG targets that they relate to using the additional classifications field[4] and classification scheme code list.[5] This update covers the SDGs and SDG targets but not the SDG indicators.

E.2 Sectors

Within the datasets that provide project level information, the sector the project relates to is provided. The level of detail to which these sectors are defined differs across the datasets and there is a lot of variation in which sectors are explicitly included. None of the datasets examined appear to be taking the sector names from any standard list.

[1] https://unstats.un.org/sdgs/indicators/indicators-list/

[2] https://sdgs.un.org/goals

[3] https://www.oecd.org/sdd/oecdmaineconomicindicatorsmei.htm

[4] https://standard.open-contracting.org/staging/infrastructure/0.9-dev/en/reference/schema/#project-schema.json,,additionalClassifications

[5] https://standard.open-contracting.org/staging/infrastructure/0.9-dev/en/reference/codelists/#classificationscheme

Table E.1 includes three examples of sector code lists from the examined datasets (some of which cover more than just infrastructure), roughly mapped to each other and to the OC4IDS "project sector" code list.[6]

Table E.1 Examples of Sector Codes Mapped on to OC4DIS Codes

2021 Inter-American Development Bank Climate Finance Database	INFRALATAM	World Bank Private Participation in Infrastructure	OC4IDS equivalent code[7]
Agriculture, forestry, land use and fisheries			Economy
Agricultural and ecological resources			Economy
Crop production and food production			Economy
Buildings, public installations and end-use energy efficiency			Governance
Energy	Energy ● electricity ● gas	Energy ● electricity ● natural gas	Energy
Energy, transport and other built environment infrastructure			Energy, transport
Information and communications technology, digital technologies	Telecommunications	Information and communication technology	Communications
Water supply and wastewater	Water ● water and sanitation ● irrigation	Water and sewerage ● treatment plant ● water utility	Water and waste
Coastal and riverine infrastructure (including built flood-protection infrastructure)	Water ● flood defenses		
Solid waste management		Municipal solid waste ● collection and transport ● integrated municipal solid waste ● treatment/disposal	Water and waste
Transport	Transport ● air transport ● road ● railways ● fluvial and maritime	Transport ● airports ● ports ● railways ● roads	Transport ● air ● water ● rail ● road ● urban

Source: World Bank, CoST, and Open Data Services.

Sector information is covered in OC4IDS within the sector field[8] taking values from the open "project sector" code list.[9] This code list covers a wide range of sectors, with the exception of "transport" these are all at a high and broad level. Previous work[10] on the development of the "project sector" code list surfaced similar issues around the heterogeneity of subsectors across different lists, particularly those within "energy" and

[6] https://standard.open-contracting.org/infrastructure/latest/en/reference/codelists/#projectsector

[7] https://standard.open-contracting.org/infrastructure/latest/en/reference/codelists/#projectsector

[8] https://standard.open-contracting.org/infrastructure/latest/en/reference/schema/#project-schema.json,,sector

[9] https://standard.open-contracting.org/infrastructure/latest/en/reference/codelists/#projectsector

[10] https://github.com/open-contracting/infrastructure/issues/16

"water and waste" sectors that are especially relevant to environmental sustainability and climate change.

E.3 Spatial data

As well as the expected geographic fields identifying the country, municipality, and city a project relates to, a number of datasets and tools surfaced during this research are explicitly geospatial, designed to be interrogated via mapping applications. This is particularly true for data relating to environmental sustainability. Examples of such data and/or tools include the Integrated Biodiversity Assessment Tool[11] and Natural England's Green Infrastructure map.[12] By providing data in this manner it is possible to provide location information that goes into more detail than simply stating the town or municipality a project relates to, or to provide information detailing the geographical extent of a project beyond a single point.

OC4IDS already provides for the publication of geospatial information within the "locations" field:[13]

> Information about the location where a project is taking place. One or more locations may be provided, or the location may be described in a number of different ways, such as a point location for the central location of construction, and a gazetteer entry to describe the region where the project is taking place.

When OC4IDS data includes structured data on project locations, it can be combined with other spatial datasets to enable various analyses, for example, to assess a project's vulnerability to climate and disaster risks.

E.4 Beneficial Ownership

Beneficial ownership data does have an international standard: the Beneficial Ownership Data Standard (BODS).[14] However, none of the three beneficial ownership data sources identified in this research use this standard. OC4IDS data can be linked to beneficial ownership data using the "primary identifier" field:[15]

> The primary identifier for this organization or participant. Identifiers that uniquely pick out a legal entity should be preferred. Consult the organization identifier guidance for the preferred scheme and identifier to use.

[11] https://www.ibat-alliance.org/

[12] https://naturalengland-defra.opendata.arcgis.com/search?q=infrastructure

[13] https://standard.open-contracting.org/infrastructure/latest/en/reference/schema/#project-schema.json,,locations

[14] https://standard.openownership.org/en/0.3.0/

[15] https://standard.open-contracting.org/infrastructure/latest/en/reference/schema/#project-schema.json,/definitions/Organization,identifier

This information can be linked to OC4IDS as part of the project-level “parties” array.[16]

E.5 Climate Change Mitigation and Adaptation

Several datasets relating to climate financing provided by supranational financial institutions include the concepts of climate change mitigation and climate change adaptation. For example, the Inter-American Development Bank Climate Finance Database[17] details the proportion of project funding that relates to either mitigation or adaptation. The Asian Development Bank’s Climate Change Financing at ABD dataset[18] also marks projects as to which type of climate change response they are addressing: mitigation or adaptation.

In OC4IDS, the “purpose”[19] and “additional classifications”[20] fields can be used to describe and classify the socioeconomic purpose of a project. In particular, additional classifications could be used to categorize a project as related to climate change mitigation or climate change adaptation. However, OC4IDS does not provide a dedicated field or standardized code list for this information.

[16] https://standard.open-contracting.org/infrastructure/latest/en/reference/schema/#project-schema.json,,parties

[17] https://data.iadb.org/DataCatalog/Dataset#DataCatalogID=11319/12617

[18] https://data.adb.org/dataset/climate-change-financing-adb

[19] ttps://standard.open-contracting.org/infrastructure/latest/en/reference/schema/#project-schema.json,,purpose

[20] https://standard.open-contracting.org/staging/infrastructure/0.9-dev/en/reference/schema/#project-schema.json,,additionalClassifications

Appendix F: Example Use Cases

F.1 Sustainability Use Cases

F.1.1 Defining Sustainability Compliance

National governments, intergovernmental organizations, and international financial institutions are increasingly developing sustainability-related goals and associated metrics that infrastructure projects must comply with, and sustainability metrics. For example, the World Bank's "Environmental and Social Framework" (World Bank 2017) sets out mandatory requirements that apply to World Bank funded projects, which include developing, implementing, and reporting against an environmental and social commitment plan[1] that sets out the measures and actions required for the project to meet the environmental and social standards.[2]

These compliance requirements impact on numerous stakeholder groups:

- Procurement officials and international financial institution's need to check project compliance with local, national, and international requirements.
- Private companies bidding for infrastructure contracts need to understand what sustainable goals the project they are bidding on must comply with to ensure their bids meets expectations. Where data is available for completed similar projects, they can learn from successful bids how to ensure compliance based on the winning bids.
- Civil society organizations (CSOs) can compare calculated metrics with initial requirements to discern how well the project meets the sustainability goals.

Requirements:

To meet the above use cases, stakeholders require data on:

- Sustainability goals that projects must comply with
- Sustainability metrics that projects will be judged against.

F.1.2 Monitoring Alignment with National Plans

National plans are created to outline how a government aims to meet specific national policy goals and international commitments, or mitigate against anticipated risks to the country and its population. Infrastructure is a regular feature of such plans, both in terms of building new infrastructure or redeveloping or retrofitting existing infrastructure to meet a goal.

For example, South Africa's "National Climate Change Adaptation Strategy" (Republic of South Africa 2020) includes a goal to "Increase physical infrastructure resilience

[1] For more information, see page 9 paragraph 40, page 21, paragraph 36 and ESS1—annex 2. Environmental Social Commitment Plan (ESCP) in the "Environmental and Social Framework".
[2] For more information, see Appendix 1: World Bank Environmental and Social Standards Summary.

and adaptive capacity" through "Invest[ing] in high-quality, climate resilient and eco-sustainable / reduced impact / public infrastructure and materials".

The following stakeholders are interested in monitoring alignment with national plans.

- Procurement officials need to show their projects are in line with national plans to justify their budget requests and award decisions.
- CSOs need to understand how individual infrastructure projects are expected to contribute to national plans to hold their governments to account with respect to policy promises made as part of a national plan.
- Private sector bidders need to understand how projects align with national plans to inform bids and business planning.

Requirements:

To support these use cases, stakeholders need to know:

- National plan the project relates to
- Which goal within the plan the project relates to
- Field: include OC4IDS long-term indicators or United Nations Sustainable Development Goals (SDGs) impacted by the project (for example "classification scheme" code list with SDG and SDG target codes).

F.1.3 Connecting to Data on Carbon Accounting

The carbon footprint of an infrastructure project is a complex issue encompassing land use changes, primary and secondary materials, ongoing use on completion, and more.

- Procurement officers need to understand the carbon balance of the whole project including materials and ongoing maintenance as part of judging individual bids.
- CSOs need the same information to monitor the project.
- Procuring entities need this information to include in local and national net-zero carbon plans and to ensure they are complying with published carbon commitments.

Requirements:

To support these use cases, stakeholders need to know:

- That the carbon footprint of the project has been calculated
- Which methodology (that is the standard tool or calculator) has been used
- Where the carbon calculations can be found.

F.1.4 Long-Term Monitoring of Infrastructure Projects

Sustainability is not a one-time issue, but something that evolves with time. For this reason, the sustainability of a project cannot be accurately measured or judged without

taking into account its long-term maintenance and use. The long-term sustainability of an infrastructure project leads to different needs for different stakeholder groups.

- International financial institutions and procuring entities need to see evidence of long-term maintenance schedules and budgets to have confidence that their investment is going to be sustainable and well used.
- Private sector actors need to understand the long-term implications of a project so they can account for this in their bids.
- CSOs need to see data on the long-term use, maintenance, and sustainability of an infrastructure project to see if the project is meeting its planned sustainability goals or causing unanticipated environmental or social problems.

Requirements:

To meet the stated use cases, stakeholders need information and data on:

- Plans for ongoing maintenance of infrastructure, including budgets.

F.1.5 Land use changes

Infrastructure projects can involve changing the land use of the location they are built on. CSOs and other interest groups need to understand if a project will be changing the use of the land it will be located on to coordinate their response to the project and advocate for their particular interests. Procurement and planning officials need to understand current land use designations to ensure the safety and legality of a project, making sure the planned location of the project is affecting indigenous populations, or next to an environmentally protected area.

Requirements:

To avoid damage to fragile ecosystems and protected populations, stakeholders need:

- Accurate location data including full project boundaries (area of influence), both at the planning stage and once the project is complete.
- Data on project supply locations and routes.

This data should be in a format suitable for consumption by common geographic information system tools.

F.1.6 Deforestation Risk and Conservation Measures

Destruction of forests and grasslands is one of the biggest causes of biodiversity loss (Jaureguiberry and others 2020). Procurement officers need to assess the risks that infrastructure projects can cause to the environment, making sure that conservation measures provided in appraisal are sufficient to enhance biodiversity and protect grasslands and areas of forest. Citizens and civil society need information on

environmental risks and conservation measures to monitor biodiversity loss and hold decision-makers and contractors to account.

Requirements:

As a specific infrastructure risk, deforestation needs special attention depending on the location and type of infrastructure. Stakeholders can be supported by data points to inform:

- What risks have been declared by procuring entities during project appraisal
- Project location and proximity to protected areas
- Which conservation measures have been provided and budgeted for.

F.1.7 Disaster Mitigation through Materials Testing and Inspections

Publishing materials testing and inspection data supports disaster-mitigation efforts in infrastructure projects. By capturing and analyzing data on the quality and durability of materials used, civil society stakeholders can proactively identify potential risks and vulnerabilities, facilitate action, and ask for remedial actions, thus ensuring the resilience of infrastructure against both man-made and natural disasters. This use case enhances the safety and long-term sustainability of infrastructure projects, reducing the impact of natural disasters by protecting both public safety and investment.

Requirements:

To support these uses cases, stakeholders need to know:

- Whether materials testing was scheduled in project plans
- Details of the tests conducted (such as material, location, process, and agencies)
- Details of any reports and certificates issued.

F.1.8 Competition and Ethical Practices

Ethical practices, particularly around labor rights, are of interest to a range of stakeholders, particularly CSOs and non-governmental organizations (NGOs), and private sector contractors. It is additionally in the interests of procuring entities to tackle any existence, or perception, of unethical practices around labor rights.

- CSOs and NGOs with a labor focus need to understand how much of a budget has been set aside at the planning and procurement stages – and also how much has been spent on labor costs during the implementation stages – to monitor for labor rights abuses.
- Private sector bidders need to understand the structure of their competitors' bids after the procurement stage to gauge if they were undercut due to unethical labor practices and make decisions regarding submitting complaints or restructuring of their own business models.

In both cases, this information requires data from a project's main contractor and any subcontractors they may hire to ensure that unfair labor practices are not being masked behind layers of subcontractors.

Requirements:

To meet the outlined use cases, stakeholders need the following data:

- At the tender stage:
  - How much of the budget is set aside or anticipated to be spent on labor costs
- At the implementation stage:
  - How much of the budget within the winning bid is set aside for labor costs
  - How many subcontractors are to be employed
  - Who the subcontractors are.

F.2 General Use Case

F.2.2 Anti-Corruption through Beneficial Ownership Data

In addition to the general anti-corruption use cases of open procurement data, a specific use case that emerged in the focus group discussions is the inclusion of beneficial ownership information. CSOs and competing private sector organizations need to understand the ownership structure of bidding contractors and subcontractors to check for potential corruption through use of shell companies.

The standard should provide the capability to link infrastructure project data with datasets on beneficial ownership, enabling stakeholders to access and analyze information related to the ownership and control of entities involved in the projects, promoting transparency and aiding anti-corruption efforts.

Requirements:

- Link to related datasets on beneficial ownership.

F.3 Platform Use Cases

F.3.1 Establishing Trust in Data and Data Permanence

Changing administrations over time sometimes leads to procurement information being published on new websites, with the older sites taken offline. Users want data to be published on one site and be available permanently. By centralizing the information, procurement officials can also easily access data from other departments without having to navigate multiple sources.

The CoST initiative should ensure the security and permanence of published data, providing similar assurances as a trusted third-party portal. This enhances the credibility and reliability of the data, making it more valuable for civil society organizations and academia.

Requirements:

- Permanently hosted, third-party location, such as the CoST website
- Collate sustainability data from across several government departments.

F.3.2 Digestible Presentation of Sustainability Information to the Public

A data platform arising from the standard should present sustainability information in a manner that is easily understandable and digestible for the public, avoiding overwhelming people with complex data. It should employ clear visualizations, concise summaries, and user-friendly interfaces to communicate effectively the vast scope of sustainability, promoting public awareness and engagement without causing information overload.

Requirements:

- Include high-level indicators and fields.

F.4 User Stories

User stories have been developed with specific descriptions of the users' needs identified in the 11 use cases. They are documented using the structure: As a [user], I want [need] so that [use case]. All the user stories are listed below, grouped by six user categories: procurement, civil society and academia, CoST stakeholder, private sector, media, and international financial institution.

F.4.1 Procurement

As a **procurement official**:

1. I want CoST sustainability recommendations to tell me what sustainability data points to look for so the standard can guide procurement.
2. I want to be able to publish information and adjust it in a clear and structured way so as to not overload or confuse the public.
3. I want to see information from other departments so I can have early awareness of their activities and ensure my department's plans are complementary.
4. I want to see information from other departments so data is not scattered, for example gender data is captured across several reports but not collated in one place.

F.4.2 Civil Society and Academia

As a member of **civil society or academia**:

1. I want information and data on sustainability standards used in individual projects integrated into CoST portals so I can easily access all of the data I need from a single source.
2. I want governments to publish data with CoST to get the data security and permanence of a third-party portal.
3. I want to connect OC4IDS data to data on the beneficial owners of suppliers so I can see whether tenders are awarded to those related to those in power or funders of the government.
4. I want to connect OC4IDS data to publicized sustainability targets around national plans, cost-benefit analysis, and risk management to kickstart conversations with other stakeholders.
5. I want high-level data to easily convey information to less-expert stakeholders.
6. I want more coordination between departments and owners of the information so joined-up data is published.

F.4.3 CoST Stakeholder

As a **CoST stakeholder (assurance professional or manager)**:

1. I want the standard to mandate the sustainability fields so I can advocate effectively for their inclusion in the publication.
2. I want internal compliance to mandated environmental and social standards to reflect in published data by comprehensively including all internal government report information.

F.4.4 Private Sector

As a **private sector contractor**:

1. I want to know the context of the national plan around infrastructure projects so we can prepare as a sector.
2. I want to know all relevant compliance requirements coming from the project funders and sponsors and how other contracts have fulfilled them, so we can see we are doing things correctly.
3. I want data to be published on a third-party portal so subsequent governments cannot change or shut down sites.
4. I want data related to compliance around labor practices to be published so unscrupulous players cannot undercut others and reduce competition.
5. I want to know how the work fits in the national plan so I can understand the ultimate benefit of the work and compare it against the plan.
6. I want planning information such as the justification for the project based on national plans or compliance standards and how the project bids were evaluated against these to be published at some point in the future, even after the procurement process has concluded, to have something to compare the results of the work to.
7. I want transparency to improve competition and encourage participation.
8. I want the press and academia to be trained to use the published information so a social audit is present.
9. I want to know how the performance of companies will be assessed at completion so I know what success looks like.
10. I want agreement on the levels of information published so excessive transparency does not lead to disinterest and apathy from the public.
11. I want to know which long-term indicators a project is being assessed against to ensure my bid encompasses them.

F.4.5 Media

As a **journalist**:

1. I want links to beneficial ownership information so I can see who the awardee has ties too.
2. I want one place to keep all the data so the data from the new portals launched by each new government is collated in one place.
3. I want to have a database of contractors so I can look for patterns.
4. I want datasets that include links to additional documents and other media with which I can use artificial intelligence and tools such as Google Pinpoint.[3]
5. I want accurate, relevant, and timely data so I can create comprehensive content and tell a compelling story with the data.
6. I want data visualizations alongside the raw data to improve data understanding.

F.4.6 International Financial Institution

As an **International Financial Institution**:

1. I want to see evidence that the long-term sustainability of the project has been taken into consideration so I have confidence the money will be well spent.
2. I want to see evidence from completed projects that they have met their stated sustainability goals so I can monitor how well my institution's funds are meeting our sustainability goals.

[3] https://journaliststudio.google.com/pinpoint/about

Glossary

Artificial Intelligence: A field which combines computer science and robust datasets to enable problem solving. It encompasses sub-fields of machine learning and deep learning.[1]

Beneficial Ownership / Beneficial Owner: The individual who ultimately owns or has significant influence or control over an entity. A company or partnership can have one or more beneficial owners. Beneficial ownership can be determined in a number of ways, but most beneficial owners are likely to be people who hold more than 25 percent of shares in the company, more than 25 percent of voting rights in the company or the right to appoint or remove the majority of the board of directors.[2]

Circularity / Circular Economy: A model of production and consumption which involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products as long as possible so that the life cycle of products is extended.[3]

Carbon Dioxide Equivalent: A metric used to compare the emissions from various greenhouse gases on the basis of their global-warming potential, by converting amounts of other gases to the equivalent amount of carbon dioxide with the same global warming potential.[4]

Contract: A mutually binding agreement that obligates the seller to provide the specified product or service or result and obligates the buyer to pay for it.[5]

Infrastructure: Physical assets (also referred to as hard infrastructure) plus the knowledge, institutions, and policy frameworks (also referred to as soft infrastructure) in which they exist and that enable them to function. These include both built, or grey, infrastructure in all sectors, and natural, or green, infrastructure (UNEP 2021).

Life-Cycle Costing: The costs of acquiring goods or services (including consultancy, design, construction, and equipment costs), the costs of operating it, and the costs of maintaining it over its life through to its disposal – that is, the total ownership costs. These costs include internal resources and overheads.[6]

Nature Based Solutions: An umbrella term used to describe a variety of solutions that are inspired and supported by nature, and which can simultaneously provide a wide range of environmental, climate, social, and economic benefits. Central to the definition of nature-based solutions is the overall net gain in biodiversity and

[1] https://www.ibm.com/topics/artificial-intelligence

[2] https://www.ukeiti.org/beneficial-ownership

[3] https://www.europarl.europa.eu/news/en/headlines/economy/20151201STO05603/circular-economy-definition-importance-and-benefits

[4] https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Carbon_dioxide_equivalent

[5] https://www.pmi.org/learning/library/project-contracts-vendor-buyer-views-7254

[6] https://www.procurementjourney.scot/tools-templates/glossary

ecosystem integrity, so the term is logically linked to the concept of "nature-positive" infrastructure development (FIDIC, WWF and AECOM 2023).

Net Zero: The balance between the amount of greenhouse gas that is produced and the amount that is removed from the atmosphere. It can be achieved through a combination of emission reduction and emission removal.[7]

Open Data: Data that anyone can access, use, and share.[8]

Open Standard: Standards made available to the public which are developed (or approved) and maintained via a collaborative and consensus-driven process.[9]

Open Format: One which places no restrictions, monetary or otherwise, upon its use and can be fully processed with at least one free/libre/open-source software tool.[10]

Procurement: Broadly defined to encompass all stages from the identification of need to the delivery and subsequent maintenance of the asset (Engineers Against Poverty 2008).

Project: A temporary endeavor undertaken to create a unique project service or result. Projects are temporary and close on the completion of the work they were chartered to deliver.[11]

Quality Infrastructure: Infrastructure that contributes to human well-being and social and economic development by supporting inclusive and sustainable growth, job creation, and access to essential services (OECD 2020b).

Resilient Infrastructure: Systems and projects that can withstand, adapt to, and recover from climate change and other shocks and stresses so they can continue to serve their core function (International Coalition for Sustainable infrastructure 2021).

Sustainability: The ability of ensuring that the needs of the present do not compromise the ability of future generations to meet their own needs (UN WCD 1987).

Sustainable Infrastructure: Built or natural systems that provide services in a manner that ensures economic and financial, social (including gender), environmental (including climate resilience), and institutional sustainability in line with the United Nations Sustainable Development Goals and over the entire infrastructure life cycle, from strategic planning to decommissioning.[12]

Value for Money: The optimum combination of whole-life cost and quality (or fitness for purpose) to meet the user's requirement. It can be assessed using the criteria of economy, efficiency, and effectiveness. A fourth "E" – equity – is now also

[7] https://www.nationalgrid.com/stories/energy-explained/what-is-net-zero

[8] https://theodi.org/

[9] https://www.itu.int/en/ITU-T/ipr/Pages/open.aspx

[10] https://opendefinition.org/od/2.1/en/

[11] https://www.pmi.org/learning/library/understanding-difference-programs-versus-projects-6896

[12] https://www.global-solutions-initiative.org/g20-insights-homepage/

sometimes used to ensure that value-for-money analysis accounts for the importance of reaching different groups (Jackson 2012).

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